UNITED
TRANSFORMERS
REACTORS
FILTERS

The Most Reliable Transformer Products in the World

UNITED TRANSFORMER COMPANY

150 VARICK STREET NEW YORK 13, N. Y.

EXPORT DIVISION: 13 EAST 40TH ST., NEW YORK 16, N. Y.

PACIFIC MFG. DIVISION: 4008 W. JEFFERSON BLVD., LOS ANGELES 16, CAL.

FILTER Filters, toroids, and other high-Q coils for every application.

HERMETIC 250 power, audio, and other items to MIL-T-27 specifications.

DOTS Transistor transformers — lowest volume, highest power.

SUBOUNCER Miniature units for tube and transistor use.

OUNCER Wide range, cased, one ounce audio units.

PLUG-IN The ouncer series with plug-in case.

LINEAR STANDARD Higest fidelity ever made.

HIPERMALLOY High-fidelity broadcast.

ULTRACOMPACT High fidelity in ½ lb. weight.

COMMERCIAL GRADE Full line industrial.

SPECIAL SERIES For the radio ham.

REPLACEMENT

DOT	SO SSO	O	P	LS	HA	A	CG	S	R	PRODUCT LINE • • • TYPE • • • PAGE
										TRANSFORMERS
							30		34	Adj. Voltage
							32			Bias
							30		34	Booster
				22						Bridging
	18	20		23			30	31		Driver
13							30	32	33	Filament
				23						Hybrid
17	18	20	19	22	27	28	29	31	33	Input
17	18	20	19	23	27	28	29	31	33	Interstage
									34	Isolation
17	18	20	19	23	27	28	29	31	33	Matching
17			19	22	27	28	29			Mixing
			19							Mike-Cable
				24			30	31		Modulation
17	18	20	19	24	27		29	31	33	Output
									34	Photoflash
14							30	32		Plate
17	18	20	19	23	27	28	29	31		Plate-to-line
12					27		30	32	33	Power
16										Pulse
									34	Signal, Control
									34	Stepdown
	18	20								Transistor
										REACTORS
13	18	20	19	19		27	28	30	32	33	Filter Chokes
					24						Modulation
										HIGH-Q COILS
7 8	7 8									Hi-Q Toroids
10	10									Hi-Q Lo-Freq.
10	10									L Decades
9	9									Variable
										FILTERS
4	4									Aircraft
	5									Bandpass
5							29			Equalizers
	5									High-pass
	5									Interstage
	5									Low-pass
5										Sound Effects
	4									Telemetering
	15									**MAG. AMPLIFIERS**

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VIC-22	9	12.00

FILTERS & EQUALIZERS

3A	5	150.00
3AX	5	250.00
4C	5	200.00

BMI — 60, 100, 120, 400, 500, 750, 1000 1500, 2000, 3000, 5000, 10000

HMI—200, 400, 500, 800, 1000, 2000, 3000

LMI—200, 400, 500, 800, 1000, 1500, 2000, 2500, 3000, 4000, 5000, 10000

BML—400, 1000

HML—200, 300, 500, 1000

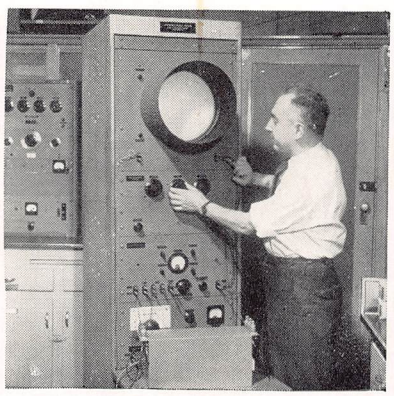
LML — 1000, 1500, 2000, 2500, 4000, 8000, 10000, 12000

Above Frequ. 5 $25.00

Special Frequ. 48.00

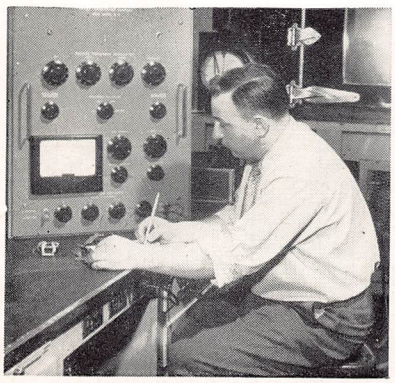
This catalogue covers the most complete line of transformers, filters, and high Q coils for military, industrial, broadcast, amateur, laboratory, and replacement purposes. It is surprising to many people to find that the bulk of UTC production is on special units not normally catalogued. A few views of the UTC Laboratories employed for the development of these special products, as well as the constant improvement of UTC catalogue items, are illustrated below.

Audio development laboratory

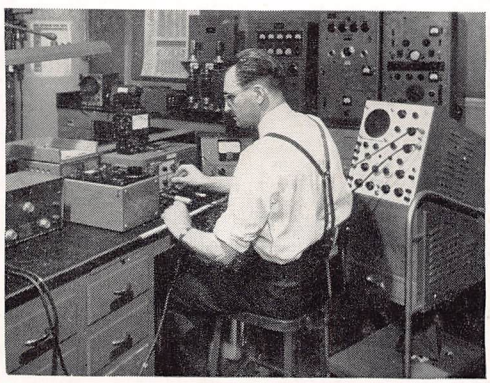


Tracing filter curves electronically

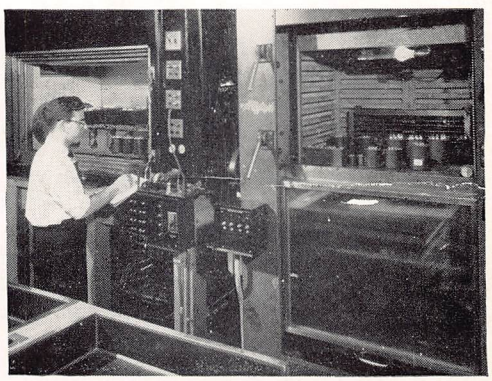
Filter development laboratory



Development tests . . . ½ cycle filter



Precision Q meter measurements

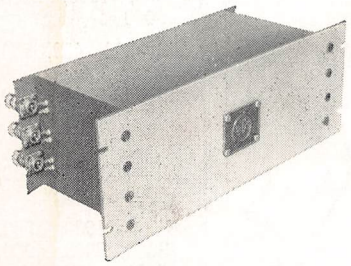


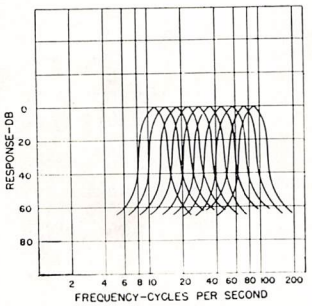
Humidity . . . temperature . . . altitude testing

UTC FOR SPECIAL FILTERS

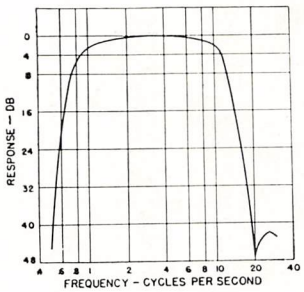
Decades of experience in the design and production of specialized filters have resulted in UTC being a first source for difficult filters. Fifteen years ago UTC was already the largest user of permalloy dust toroids in the world (exclusive of the telephone system). Present designs include a wide variety of core materials, structures, and winding methods to provide maximum performance in electrical requirements and stability.

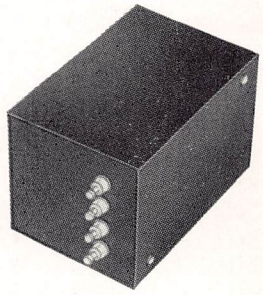
UTC stock filters are shown on page 5. However, the bulk of UTC filter production is in the form of special units to customers needs, with applications ranging from 1/10th cycle to 400 megacycles. The illustrations on this page cover a few of the thousands of unusual filters produced at UTC.



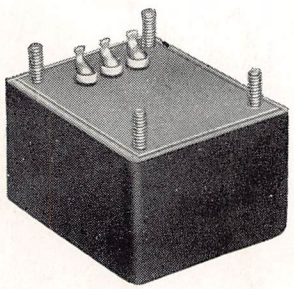


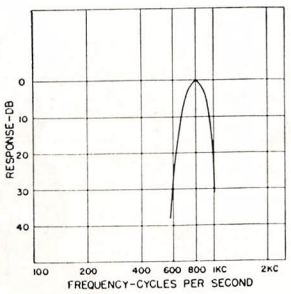
These low frequency band pass filters are held to 1 DB tolerance at the 3 DB crossover...600 ohm...4 filters per 7½" rack panel.



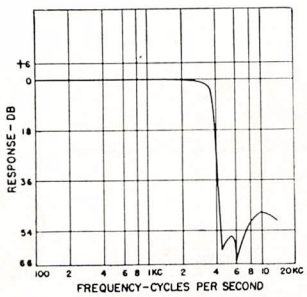


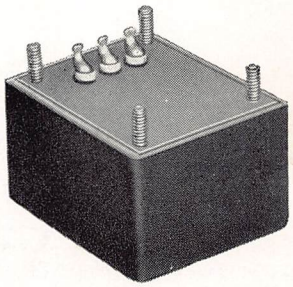
This ultra low frequency filter has a band pass range of one cycle to 10 cycles... 50,000 ohms... 700 cubic inches.



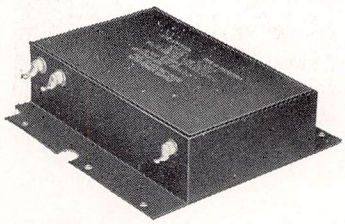


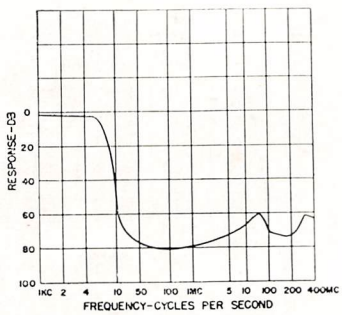
This 600 ohm miniaturized .8 KC band pass filter is housed in a case only 1" x 1¾" x 2½".



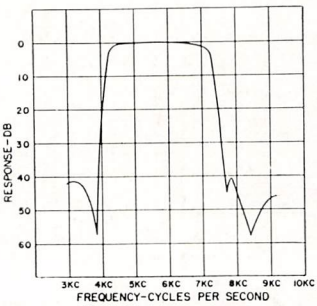


This 600 ohm miniaturized low pass filter is housed in a case only 1" x 1¾" x 2½".



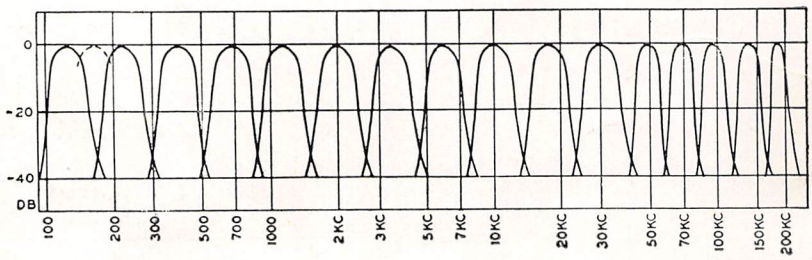


This power line filter provides correct output voltages from sources of 50 to 400 cycles... noise attenuation is from 14 KC to 400 MC... 29 cubic inches.



This band pass filter is designed for sharp cut-off at both ends of the range... 10,000 ohms... case dimensions 1⅝"x2½"x3¼".

The curve illustrated shows a group of filters affording sixteen separate bands in the audio and supersonic region with 35 DB attenuation at the cross-over points. These have also been supplied spaced further apart (40 DB cross-over), with intermediate bands, permitting flat top band pass action for any selected range from 100 cycles to 200 KC.



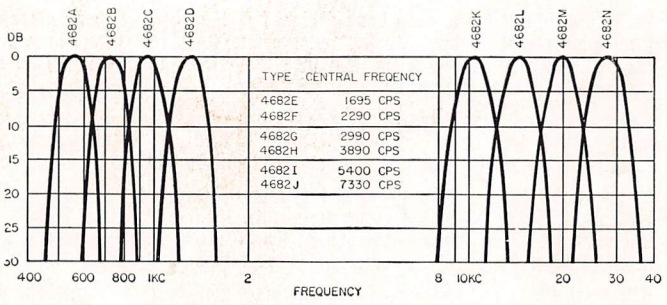
UTC FILTERS TO SPECIFICATIONS

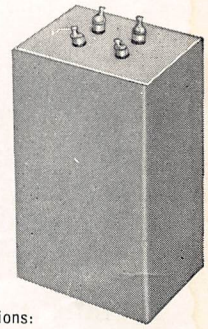
Illustrated below are a few of the thousands of special filters supplied to customers needs. Included in our semi-standard filters are:

- A full line of telemetering filters in 15% and 30% band width.
- Multiplex telegraph tone channel filters, receiving and transmitting types.
- Aircraft filters for navigation, blind landing, and radio range equipment.
- Filters for all circuit needs in frequency shift and diversity receiver use.
- Band pass filters of overlapping channel type for sound and noise analysis.
- RF filters of low pass, high pass, band pass, and power line types.

TELEMETERING FILTERS

UTC manufactures a wide variety of band pass filters for multi-channel telemetering. Illustrated are a group of filters supplied for 400 cycle to 40 KC service. Miniaturized units have been made for many applications. For example a group of 4 cubic inch units which provide 50 channels between 4 KC and 100 KC.



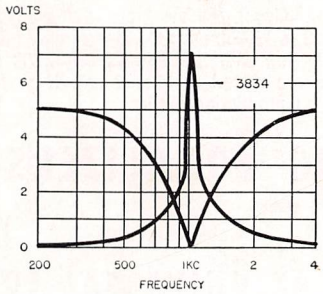


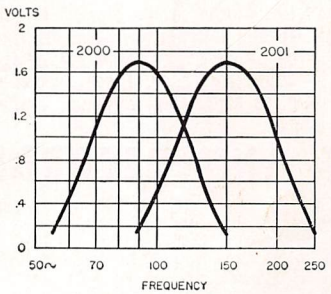
Dimensions:
(4682A) 2½ x 3⅛ x 5½".

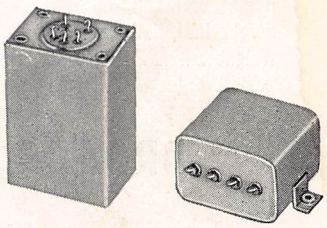
AIRCRAFT FILTERS

UTC has produced the bulk of filters used in aircraft equipment for over a decade. The curve at the left is that of a miniaturized (1020 cycles) range filter providing high attenuation between voice and range frequencies.

Curves at the right are that of our miniaturized 90 and 150 cycle filters for glide path systems.



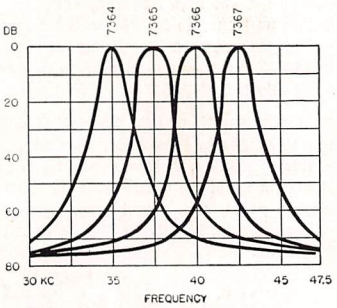


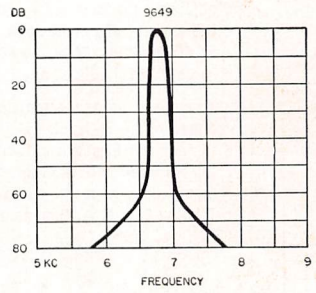


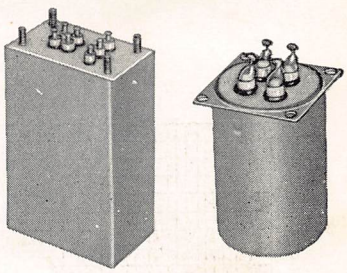
Dimensions:
(3834) 1¼ x 1¾ x 2-3/16".
(2000, 1) (rt.) 1¼ x 1¾ x 1⅝".

CARRIER FILTERS

A wide variety of carrier filters are available for specific applications. This type of tone channel filter can be supplied in a varied range of band widths and attenuations. The curves shown are typical units.



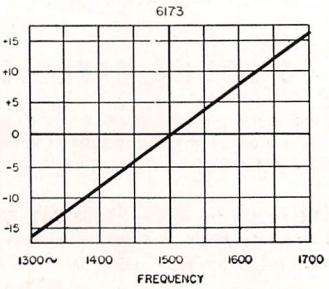


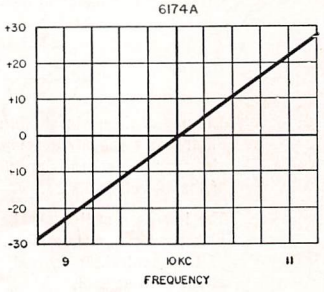


Dimensions:
(9649) 1½ x 2 x 4".
(7364 series) (rt.) 1⅝ x 1⅝ x 2¼"

DISCRIMINATORS

These high Q discriminators provide exceptional amplification and linearity. Typical characteristics available are illustrated by the low and higher frequency curves shown. Y axis values are volts.

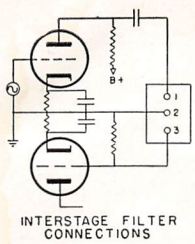




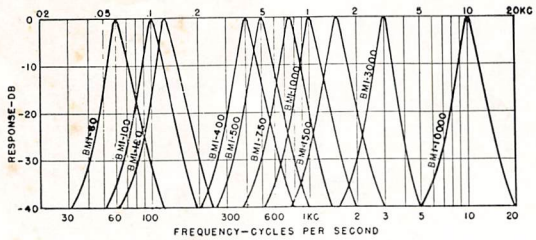
Dimensions:
(6173) 1-1/16 x 1⅜ x 3".
(6174A) 1 x 1¼ x 2¼".

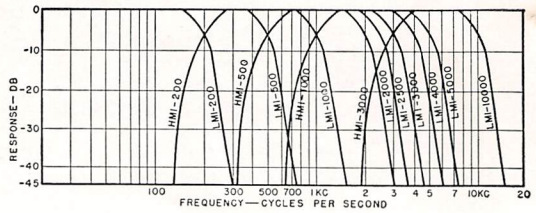
UTC INTERSTAGE AND LINE FILTERS

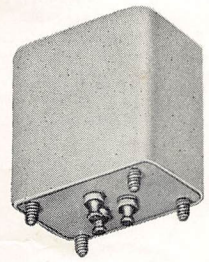
(Hermetically sealed to MIL-T-27A specs.)



INTERSTAGE FILTER CONNECTIONS







FILTER CASE M

Base	1 3/16" x 1 11/16"
Mtg.	3/4" x 1 1/4"
Mtg. Studs (stainless)	6-32
Cutout	7/8" dia.
Height, BMI, LMI, BML	1 5/8"
Height, HMI, HML, LML	2 1/2"
Weight	6 oz. and 9 oz.

UTC standardized filters have been designed to take care of many present day filter requirements through stock units. The interstage type filters have a nominal impedance of 10,000 ohms, and lend themselves to effecting gain simultaneously with their frequency discrimination.

BMI units (Band Pass) have 2:1 gain. They are sharply peaked, having approximately 2 DB attenuation at plus or minus 3% from center frequency and attentuation of 40 DB per octave as shown. Input 10,000 ohms, output to grid.

HMI units (High Pass) have a loss of less than 6 DB at cutoff frequency, and an attenuation of 35 DB at .67 cutoff frequency. Input and output 10,000 ohms. **LMI** units (Low Pass) have a loss of less than 6 DB at cutoff frequency, and an attenuation of 35 DB at 1.5 cutoff frequency. Input and output 10,000 ohms.

HML (High Pass), and **LML** (Low Pass) filters are similar to the interstage filters, in all characteristics, except that they are intended for an input and output impedance of 500/600 ohms. **BML** (Band Pass) have input of 500/600 ohms, output to grid.

All of the standard filters are housed in **hermetically sealed** cases, shielded to reduce hum pickup to 150 MV per gauss at 60 cycles.

In addition to the stock filters listed, any of the six types are available as **special units** for any frequency from 100 to 12,000 cycles. Order by type followed by frequency, as LMI 2800, designating low pass interstage filter—2800 cycles cutoff frequency. These special units are priced at $35.00 net. If preferred, glass solder seal terminals available on production orders.

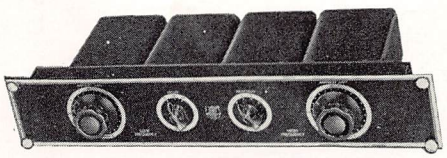
STOCK FREQUENCIES

(Number after letters is frequency)

BMI-60	LMI-2000
BMI-100	LMI-2500
BMI-120	LMI-3000
BMI-400	LMI-4000
BMI-500	LMI-5000
BMI-750	LMI-10000
BMI-1000	BML-400
BMI-1500	BML-1000
BMI-2000	HML-200
BMI-3000	HML-300
BMI-5000	HML-500
BMI-10000	HML-1000
HMI-200	LML-1000
HMI-400	LML-1500
HMI-500	LML-2000
HMI-800	LML-2500
HMI-1000	LML-4000
HMI-2000	LML-8000
HMI-3000	LML-10000
LMI-200	LML-12000
LMI-400	
LMI-500	
LMI-800	
LMI-1000	
LMI-1500	

BROADCAST AND RECORDING EQUALIZERS AND FILTERS

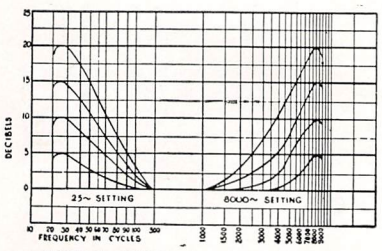
500/600 ohms



3AX UNIVERSAL EQUALIZER

The universal characteristics of the **UTC 3AX** equalizer have made it the most popular item for broadcast and recording equalization. This unique unit, with which most communication engineers are already familiar, is an accurately calibrated, quickly adjustable, combined low and high frequency equalizer. The low frequency controls include a switch for adjusting the maximum equalization frequency to **25, 50, or 100 cycles** and a calibrated T-pad for exact adjustment of the amount of equalization. The high frequency portion of this unit includes a switch to set maximum equalization point at **4000, 6000, 8000, 10,000 or 15,000 cycles,** and a similar calibrated control reading directly in DB. **Equalization up** to **25 DB** available at any frequency selected.

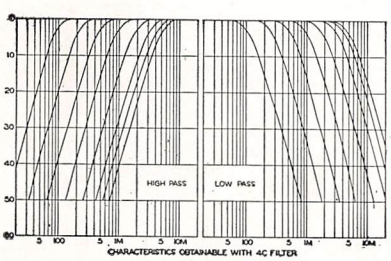
Through a unique arrangement of compensating pads, changes in adjustment of the 3AX equalizer do not affect the apparent aural level. This permits changes in tone color, with negligible change in volume. Where rapid changeover is required in service from one line to another, or from recording to play back, it is merely necessary to predetermine the required setting. The actual adjustment of the controls can be taken care of almost instantaneously. The construction is of the depressed chassis, etched panel, rack mount type. Thoroughly shielded against inductive pickup with UTC Trialloy Shielding. Dimensions of panel 3½" x 19". Depth 7½". Weight 15 lbs.



TYPICAL CURVES OBTAINABLE WITH 3A OR 3AX EQUALIZER

3A UNIVERSAL EQUALIZER

The **3A** equalizer is identical to the 3AX described above, except that it does not incorporate the compensating pads for constant insertion loss. The insertion loss is roughly proportional to the amount of equalization employed. All other characteristics identical with the 3AX unit, this item weighs 10 lbs.

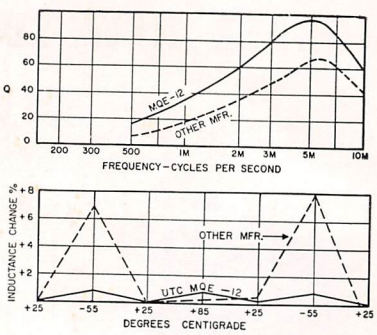


4C SOUND EFFECTS FILTER

The use of filters to obtain unusual sound effects is now finding wide application in broadcast technique. The **Model 4C Filter** was originally developed for one of the large broadcasting chains, and is now used extensively by most broadcast stations. Two controls are provided by the 5¼" x 19" panel, which is similar in appearance to the 3AX unit. The weight of the 4C unit is 20 lbs.

The low pass switch can be set for cutoff frequencies of **100, 250, 500, 1000, 2000, 3000, 4000, or 5000 cycles.** The **high pass** switch has identical frequency points. The great number of cutoff frequencies provides for a wide latitude of tone control. If desired, though not normally necessary, external potentiometers may be inserted in the circuit for attenuation control.

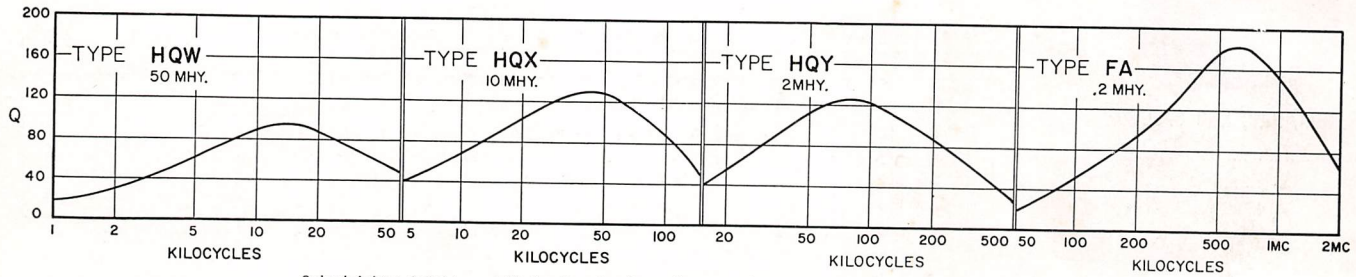
UTC FOR SUPERIOR HIGH Q COILS



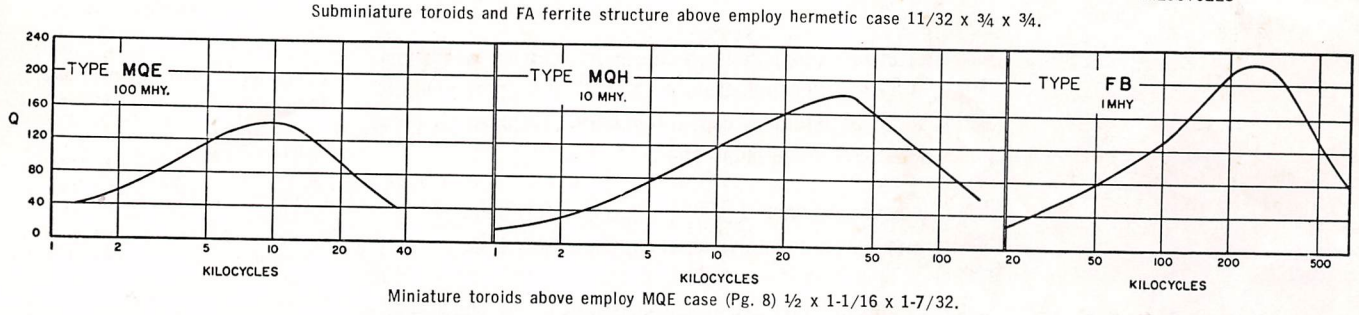
Twenty years of specialization in high Q coils are reflected in the permalloy dust toroid, ferrite, and laminated structures produced by UTC today.

Special winding machines and stabilization methods have resulted in coils of superior performance and stability. For example, the curves at the right show the performance of a stock UTC MQE unit compared to an "equivalent" employing same type permalloy dust core.

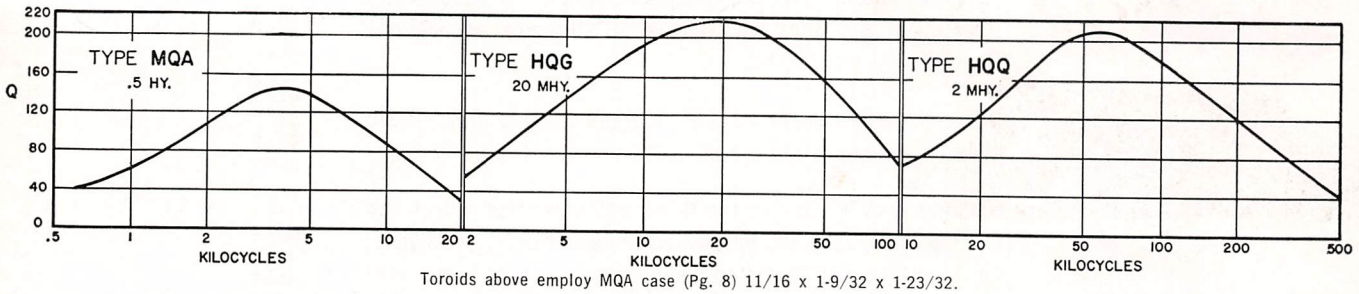
While this catalog lists 125 stock high Q coils, a substantial portion of our production is on special coils to customers requirements. The curves below illustrate the capabilities of a few popular structures among the many varied permalloy dust, ferrite, and laminated types produced by UTC.



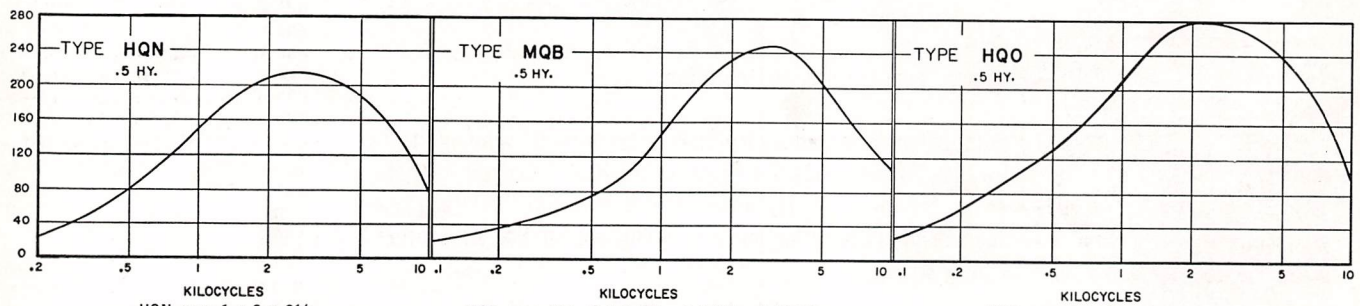
Subminiature toroids and FA ferrite structure above employ hermetic case 11/32 x ¾ x ¾.



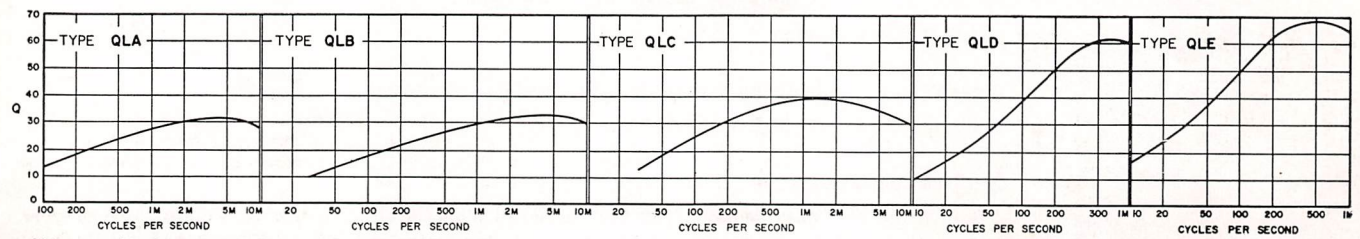
Miniature toroids above employ MQE case (Pg. 8) ½ x 1-1/16 x 1-7/32.



Toroids above employ MQA case (Pg. 8) 11/16 x 1-9/32 x 1-23/32.



HQN case 1 x 2 x 2¼ | MQB case (Pg. 8) 1-3/16 x 2-9/16 x 2-13/16 | HQO case 1-3/16 x 2-¾ x 3



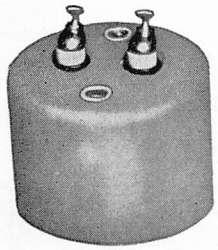
QLA case SOM ⅝ x ¾ x 1-1/16 | QLB case RC-25 (Pg. 17) | QLC case RC-37 (pg. 29) | QLD case RC-50 (pg. 29) | QLE case RC-75 (pg. 29)

Laminated structures above indicate Q obtainable at any specific frequency by designing for that frequency.

ORDER NEW SUPERIOR "M" SERIES WHERE POSSIBLE→

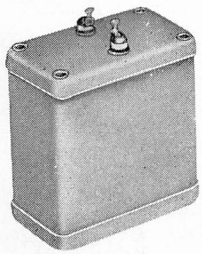
UTC HIGH Q TOROID INDUCTORS

(Hermetically sealed to MIL-T-27 Specs.)



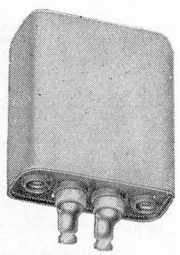
HQA, HQC, HQD CASE

Diameter	$1\frac{13}{16}$"
Height	$1\frac{3}{16}$"
Mounting	$1\frac{1}{8}$"
Screws	6-32
Cutout	$\frac{9}{16}$" x $1\frac{3}{16}$"
Weight	5 oz.



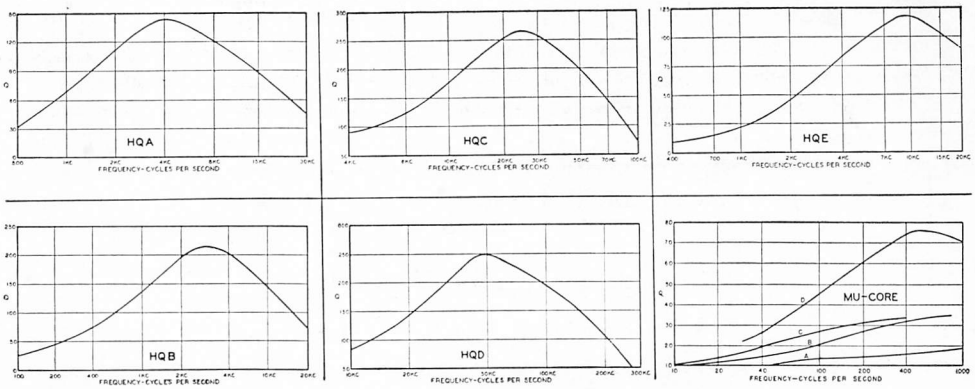
HQB CASE

Length	$2\frac{5}{8}$"
Width	$1\frac{5}{8}$"
Height	$2\frac{5}{8}$"
Mounting	$1\frac{11}{64}$" x $2\frac{11}{64}$"
Screws	6-32
Cutout	$\frac{9}{16}$" x $1\frac{1}{8}$"
Unit Weight	14 oz.



HQE CASE
(sub-miniature)

Length	$1\frac{1}{16}$"
Width	$\frac{1}{2}$"
Height	$1\frac{7}{32}$"
Mounting	$\frac{3}{4}$"
Screws	4/40
Cutout	$\frac{5}{16}$" x $\frac{1}{2}$"
Unit Weight	1.5 oz.



There are many applications in the audio, carrier, and supersonic fields requiring inductors of high Q and great stability. The HQ series of permalloy dust toroid units developed for these applications have remarkable characteristics.

HQA coils have maximum Q (100) at approximately 5 Kc.
HQB coils have maximum Q (200) at approximately 4 Kc.
HQC coils have maximum Q (200) at approximately 30 Kc. **HQD** coils have maximum Q (200) at approximately 60 Kc. The stability is excellent and types are available for all high Q applications from 300 cycles to 300 Kc.

HQE coils have maximum Q (120) at approximately 10 Kc. These coils are ideal for miniature applications.

Stability is excellent. For the HQA-7 coil illustrated the inductance change is less than 1% for applied voltages from .1 to 25 volts. For the HQB-5 coil illustrated the inductance change is less than 1% for applied voltage from .1 to 50 volts. DC is permissible through the coil. Inductance is virtually independent of frequency, temperature, and vibration.

Hum pickup is extremely low due to the toroidal winding structure . . . 70 microvolts per gauss for the HQA, 140 microvolts per gauss for the HQB. The cased toroid structure permits close spacing of units, effecting a coupling attenuation of approximately 80 DB.

All HQ coils are **hermetically sealed.** Units are laboratory adjusted to **1% tolerance** . . . 0 DC.

Other Values of Inductance than those listed available on special order at price of next higher listed value.

Mu-Core Coils employ special laminated core structures for good stability and low external field. The curves shown indicate approximate Q obtainable at any specific frequency by designing for that frequency. (See page 6.)

Type No.	Inductance Value (0 DC)	*DC MA Max.
HQA-1	5 mhy.	*400
HQA-2	12.5 mhy.	*260
HQA-3	20 mhy.	*200
HQA-4	30 mhy.	*160
HQA-5	50 mhy.	*130
HQA-6	80 mhy.	*100
HQA-7	125 mhy.	*85
HQA-8	200 mhy.	*65
HQA-9	300 mhy.	*50
HQA-10	.5 hy.	*40
HQA-11	.75 hy.	*35
HQA-12	1.25 hy.	*26
HQA-13	2. hy.	*20
HQA-14	3. hy.	*16
HQA-15	5. hy.	*13
HQA-16	7.5 hy.	*10
HQA-17	10. hy.	*9
HQA-18	15. hy.	*8
HQB-1	10 mhy.	*410
HQB-2	30 mhy.	*240
HQB-3	70 mhy.	*170
HQB-4	120 mhy.	*120
HQB-5	.5 hy.	*60
HQB-6	1. hy.	*41
HQB-7	2. hy.	*30
HQB-8	3.5 hy.	*22
HQB-9	7.5 hy.	*16
HQB-10	12. hy.	*11
HQB-11	18. hy.	*9
HQB-12	25. hy	*8
HQC-1	1 mhy.	
HQC-2	2.5 mhy.	
HQC-3	5 mhy.	
HQC-4	10 mhy.	
HQC-5	20 mhy.	
HQD-1	.4 mhy.	
HQD-2	1. mhy.	
HQD-3	2.5 mhy.	
HQD-4	5 mhy.	
HQD-5	15 mhy.	
HQE-1	5 mhy.	
HQE-2	10 mhy.	
HQE-3	50 mhy.	
HQE-4	100 mhy.	
HQE-5	200 mhy.	

*The DC MA Max. shown will drop the coil inductance slightly . . . this drop being proportionately smaller at lower DC currents.

NEW "M" TYPE TOROIDS

MAXIMUM Q MINIMUM SIZE

(Hermetically sealed to MIL-T-27A specs.)

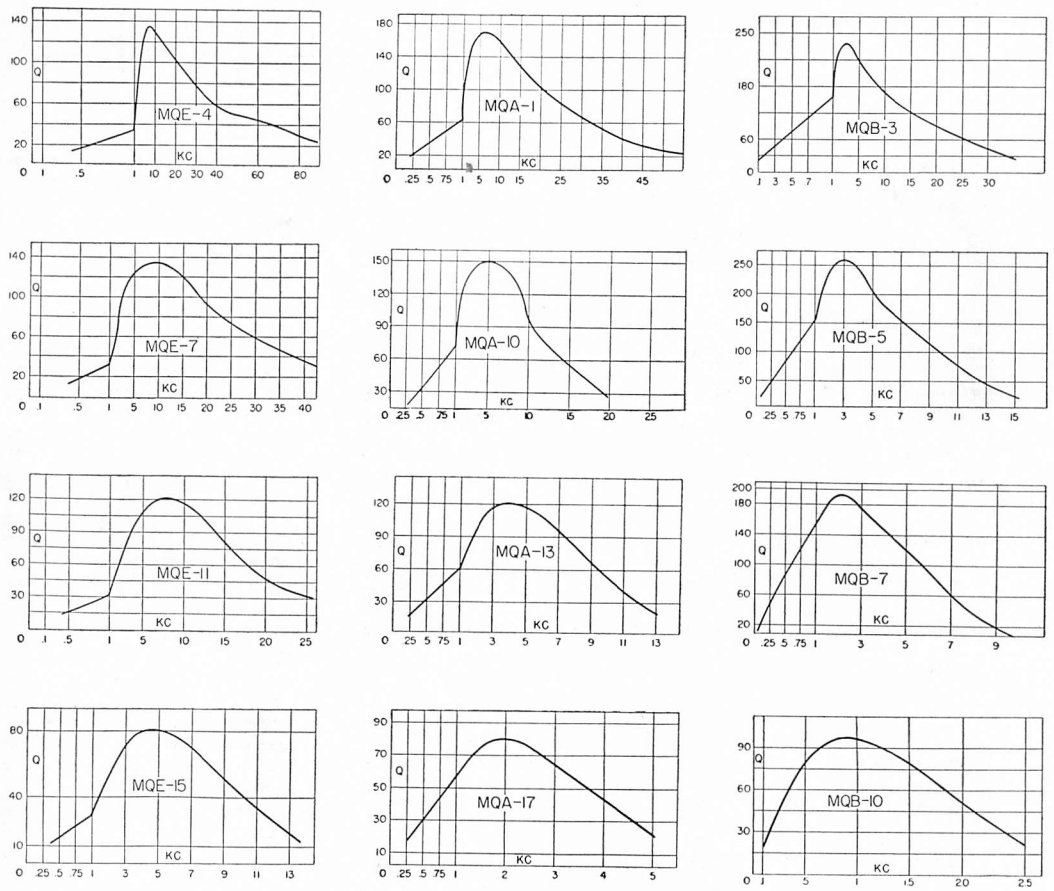
UTC Permalloy Dust Toroids have been the standard of the industry for over 15 years. The **MQ series** of coils provide the highest Q factor in their class (see curves below), with miniaturized dimensions. All units are **hermetically sealed** to MIL-T-27 Specifications . . . laboratory adjusted to 1% tolerance—0 DC.

The **stability** is excellent. For the MQE-7 the inductance change is less than 1% for voltages from .1 to 3 volts. The MQA-13 change is less than 1% for applied voltages from .1 to 20 volts. The MQB-5 change is less than 1% for applied voltages from .1 to 50 volts. DC is permissible through the coil (values listed below). Inductance is virtually independent of frequency, temperature and vibration.

Hum pickup is extremely low due to the toroidal winding structure, with windings uniformly spread over the core. The case is of high permeability, affording additional shielding such that close spacing of units can be effected, the coupling attenuation being approximately 80 DB.

Other values of inductance than those listed are available on special order at the price of the next higher listed value. Uncased and molded toroids or glass solder seal terminals available on production orders.

TYPICAL Q CURVES



MQE TYPES

Type No.	Inductance (0 DC)	*DC MA Max.
MQE-1	7 mhy.	*135
MQE-2	12 mhy.	*100
MQE-3	20 mhy.	*80
MQE-4	30 mhy.	*65
MQE-5	50 mhy.	*50
MQE-6	70 mhy.	*40
MQE-7	100 mhy.	*35
MQE-8	150 mhy.	*30
MQE-9	.25 hy.	*22
MQE-10	.4 hy.	*17
MQE-11	.6 hy.	*14
MQE-12	.9 hy.	*12
MQE-13	1.5 hy.	*9
MQE-14	2 hy.	*8
MQE-15	2.8 hy.	*7.2

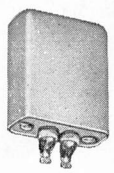
MQA TYPES

Type No.	Inductance (0 DC)	DC MA Max.
MQA-1	7 mhy.	*250
MQA-2	12 mhy.	*200
MQA-3	20 mhy.	*150
MQA-4	30 mhy.	*125
MQA-5	50 mhy.	*100
MQA-6	70 mhy.	*80
MQA-7	120 mhy.	*60
MQA-8	.2 hy.	*50
MQA-9	.3 hy.	*40
MQA-10	.5 hy.	*30
MQA-11	.7 hy.	*25
MQA-12	1 hy.	*20
MQA-13	1.5 hy.	*17
MQA-14	2.5 hy.	*13
MQA-15	4 hy.	*10
MQA-16	6 hy.	*9
MQA-17	10 hy.	*7
MQA-18	15 hy.	*5
MQA-19	22 hy.	*4

MQB TYPES

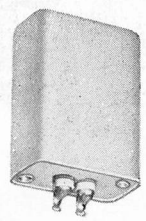
Type No.	Inductance (0 DC)	DC MA Max.
MQB-1	10 mhy.	*400
MQB-2	30 mhy.	*250
MQB-3	70 mhy.	*170
MQB-4	120 mhy.	*120
MQB-5	.5 hy.	*60
MQB-6	1 hy.	*40
MQB-7	2 hy.	*30
MQB-8	3.5 hy.	*22
MQB-9	7 5 hy.	*16
MQB 10	12 hy.	*11
MQB-11	18 hy.	*9
MQB-12	25 hy.	*8

*The DC MA Max. shown will drop the coil inductance slightly . . . this drop being proportionately smaller at lower DC currents.



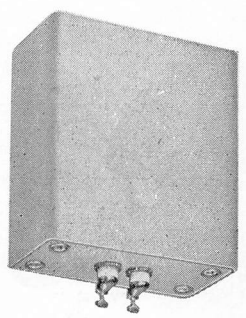
MQE CASE

Length	1 1/16"
Width	1/2"
Height	17/32"
Mounting	3/4"
Screws	4/40"
Cutout	5/16" x 1/2"
Unit Weight	1.5 oz.



MQA CASE

Length	1 9/32"
Width	1 1/16"
Height	1 23/32"
Mounting	7/8" x 9/32"
Screws	4/40"
Cutout	5/16" x 1/2"
Unit Weight	4 oz.

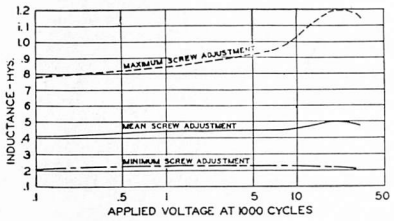


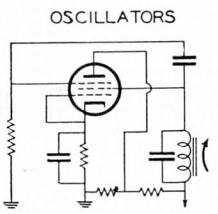
MQB CASE

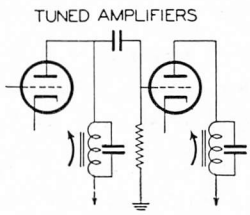
Length	2 9/16"
Width	1 3/16"
Height	2 13/16"
Mounting	2 1/16" x 1 1/16"
Screws	6/32"
Cutout	7/8" x 1/2"
Unit Weight	14 oz.

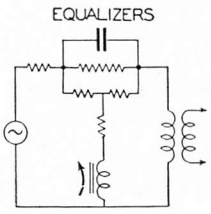
UTC VARIDUCTORS

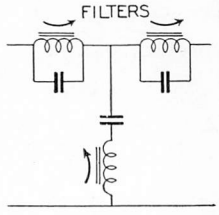
VARIABLE INDUCTORS

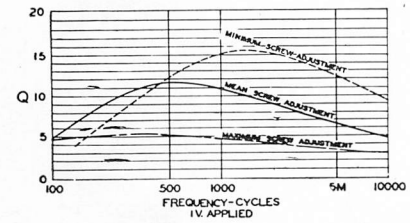


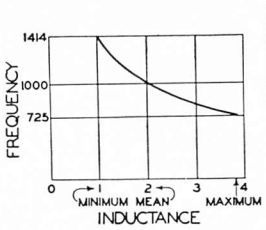


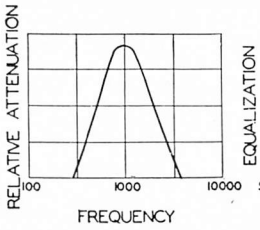


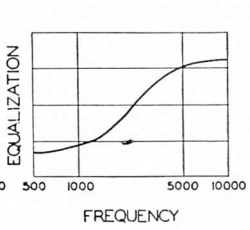


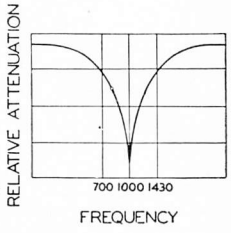


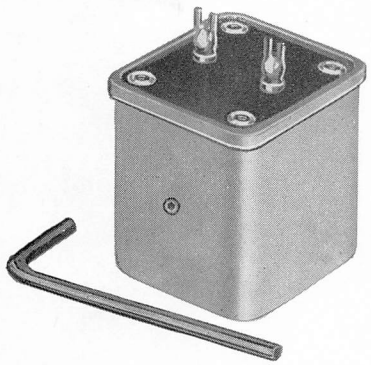












Type	Mean Hys.	DC MA*
VIC-1	.0085	75
VIC-2	.013	60
VIC-3	.021	50
VIC-4	.034	40
VIC-5	.053	35
VIC-6	.084	30
VIC-7	.13	25
VIC-8	.21	21
VIC-9	.34	18
VIC-10	.54	15
VIC-11	.85	12

Type	Mean Hys.	DC MA*
VIC-12	1.3	10
VIC-13	2.2	8
VIC-14	3.4	7
VIC-15	5.4	6
VIC-16	8.5	5
VIC-17	13.	4
VIC-18	21.	3.5
VIC-19	33.	3
VIC-20	52.	2
VIC-21	83.	1.5
VIC-22	130.	1

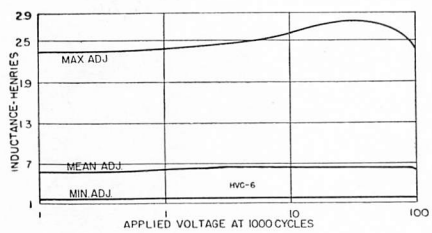
UTC type VIC variable inductors offer a revolutionary approach to the problem of tuned audio circuits. By adjusting a set screw in the side of the case, an inductance value of +85%, −45% from mean value is obtainable. Range is covered in 600° rotation. Setting is positive. Effective Q for a wide frequency range and variation of inductance with applied AC voltage are shown on the illustrated curves, for a typical VIC unit.

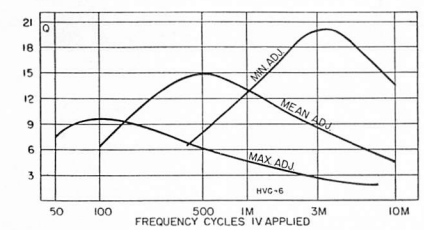
The VIC inductor is housed in a rugged die cast case $1^{11}/_{32}$" long, $1\frac{1}{4}$" wide and $1^{7}/_{16}$" high with mounting centers on terminal board side $^{13}/_{16}$" by $2^{9}/_{32}$", tapped for 4-40 screw. Weight is $5\frac{1}{2}$ oz.

*DC MA shown is maximum recommended . . . will effect some reduction in inductance and Q.

UTC HERMETIC VARIDUCTORS

**Variable inductors hermetically sealed to MIL-T-27A spec.





Type No.	Min. Hys.	Mean Hys.	Max. Hys.	DC* Ma
HVC-1	.002	.006	.02	100
HVC-2	.005	.015	.05	60
HVC-3	.011	.040	.11	40
HVC-4	.03	.1	.3	30
HVC-5	.07	.25	.7	20
HVC-6	.2	.6	2	15
HVC-7	.5	1.5	5	10
HVC-8	1.1	4.0	11	7
HVC-9	3.0	10	30	5
HVC-10	7.0	25	70	3.5
HVC-11	20	60	200	2
HVC-12	50	150	500	1.5

UTC variable inductors have served as the ideal solution to many filter, oscillator, equalizer, and tuned amplifier problems—for over a decade. Extended development has now made possible the new HVC series of inductors with improved characteristics. They are hermetically sealed to MIL-T-27 specs . . . extremely compact . . . wider inductance range . . . higher Q's . . . lower and higher frequencies . . . superior voltage and temperature stability.

Adjustment of set screw in top of case permits changing inductance + 200%, −70% of nominal value shown. Range is covered in 900° rotation. Setting is positive. Effective Q for a wide frequency range and variation of inductance with applied AC voltage are shown on the illustrated curves, for a typical HVC unit. Case dimensions are $1\frac{1}{8}$" long, $^{25}/_{32}$" wide, $1^{7}/_{32}$" high. The two terminals and two 4/40 mounting studs are on opposite diagonals — $^{15}/_{16}$" spacing.

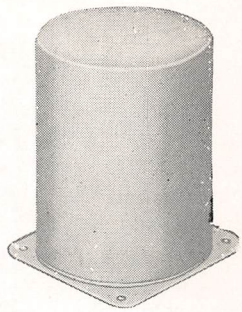
**Pat. Pending

*DC MA shown is maximum recommended . . . will effect some reduction in inductance and Q.

UTC LOW FREQUENCY HIGH Q COILS

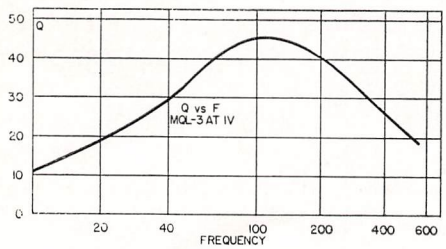
(Hermetically sealed to MIL-T-27A Specs.)

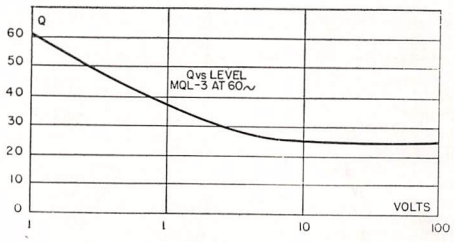
Permalloy dust toroids are not suited to providing high Q at low frequencies. The MQL series of laminated Hipermalloy coils were specifically designed for this class of service. The unique structure employed provides exceptional Q and stability. Inductance values are laboratory adjusted to 2% tolerance at 1 volt, 60 cycles. Stability with voltage is excellent, for MQL-3 inductance variation is less than 1% from .1 V. to 1 V. 60 cycles. Temperature stability is exceptional, total inductance swing being less than 3.5% for the wide range of −55°C to +85°C. A hum reducing lamination structure plus heavy Hipermalloy shielding provide very low hum pickup . . . 240 microvolts/gauss for MQL-3 series connected. Two identical windings brought out to four terminals permit series, parallel, center tapped, or transformer type connections.



MQL CASE

Diameter	1 3/16"
Height	2½"
Mounting	1½" x 1½"
Screw	6-32
Cutout	1½" dia.
Weight	1 lb.





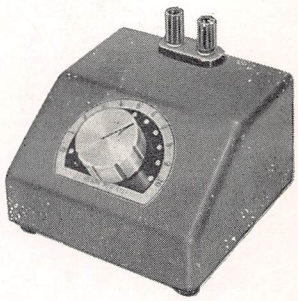
Type No.	Series Henries (0 DC)	Parallel Henries (0 DC)
MQL-1	10	2.5
MQL-2	20	5
MQL-3	200	50
MQL-4	400	100

HIGH Q PRECISION INDUCTANCE DECADES

UTC DI inductance decades are invaluable instruments for design and experimental work with tuned circuits, wave filters, and equalizers. They set new standards of Q, stability, frequency range, and convenience. The low hum pickup toroid coils employ a new permalloy dust core which, combined with special winding methods, provides very high Q, excellent voltage and temperature stability, and high self resonance frequency. The switch employed is a new low capacity type which lab tests have proven for low contact resistance after 100,000 operations. The inductance values are laboratory adjusted to better than 1% precision.

DI inductance decades are housed in a compact, rugged, die cast case with control on a sloping panel, ideally suiting these units to laboratory use. Ganging panels are available for mounting two, three, or four decades together. It is merely necessary to unscrew the four rubber feet at bottom of decade to attach to panel.

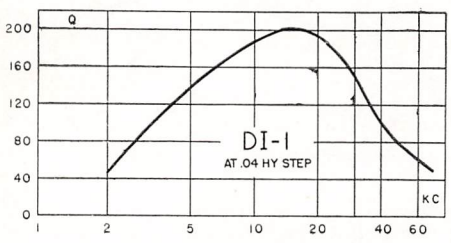
Type No.	Induct. Henries	Optimum Range	Max. Q	Max. ACMA	Ins. Test Volts RMS
DI-1	10 x .01	2-60 KC	200	500	500
DI-2	10 x .1	.25-20 KC	200	150	500
DI-3	10 x 1	.25-10 KC	200	50	500
DI-4	10 x 10	.2-1.5 KC	100	15	500

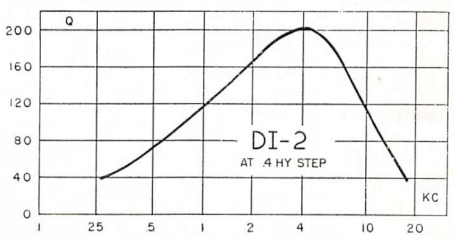


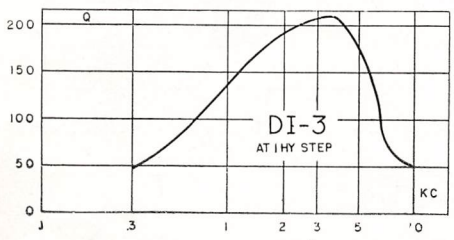
DI CASE

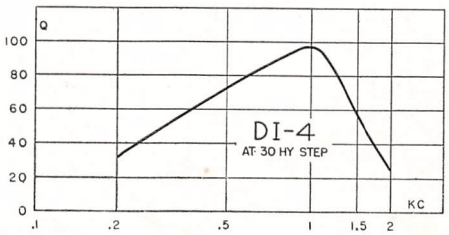
Length	4½"
Width	4⅜"
Height	2⅜"
Weight	2 Lbs.

DP-2 ..... Gangs 2 decades
DP-3 ..... Gangs 3 decades
DP-4 ..... Gangs 4 decades









UTC HERMETIC POWER COMPONENTS

GENERAL CHARACTERISTICS

The necessity for long life and reliability in military components is obvious. It is on the basis of these needs that the MIL-T-27 Specification was developed. In addition, however, an increasing number of industrial equipment manufacturers are becoming concerned with the reliability of components in their equipment, frequently turning to hermetically sealed components. The necessity for reliability in industrial service is clear when the cost of an hour's shutdown of a broadcast schedule or industrial control system is visualized. The series of hermetic transformers and reactors described on the following pages employ new concepts to provide units for a wide range of both military and **industrial** applications.

General Characteristics:

UTC hermetic power components are rugged designs with high safety factor in all characteristics. Except for a few large sizes, all units are in standard drawn MIL cases with internal structure directly welded to the mounting studs. All units fully meet MIL-T-27 Specifications, and are suited for airborne, ground communications, and marine service of every type. Their long life and reliability in structure also suit these units ideally to **industrial** equipment requiring high reliability.

Industrial and Military Ratings:

The insulation operating temperature in a transformer considerably controls its life and reliability. In Class "A" constructions an increase of approximately 8° C. in temperature can halve the transformer life. This operating temperature is the sum of the transformer's temperature rise and the ambient temperature. For military applications ambient is based on 65° C. because of the adverse conditions frequently encountered in military service. Industrial applications normally encounter ambients which are appreciably lower. As a result, the temperature rise in **industrial** applications can be approximately 10° higher (45° C. to 50° C. rise), still providing the same overall life and reliability. This results in the ability to operate the same components at somewhat greater ratings.

The listings of our "H" series power transformers, filament transformers, plate transformers, and filter reactors are given for both MIL-T-27 and **industrial** service, the latter in bold type.

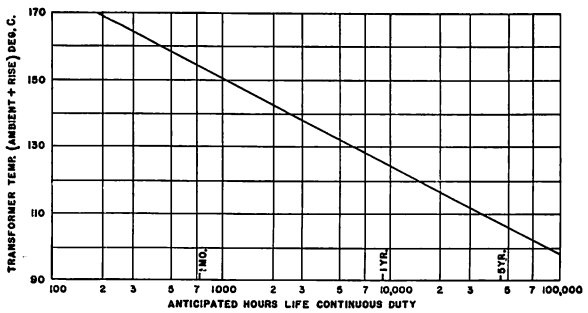
These units more than meet MIL-T-27 requirements in many aspects. The insulation employed has exceptional safety factor, taking into consideration the most severe conditions which may be encountered in service. The use of special core materials provides high efficiency and small size. The transformer regulation has been a fundamental design consideration in all units to provide for diverse applications in which they may be employed.

Dual Voltage Ratings:

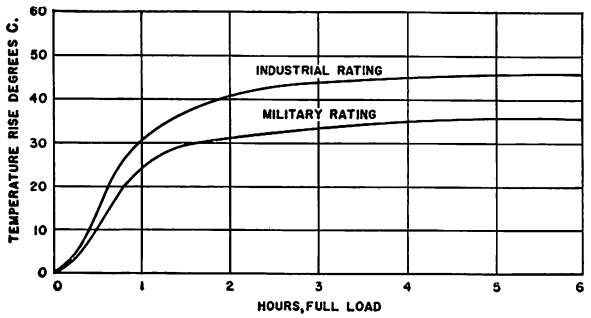
UTC hermetic plate and power transformers incorporate a tapped high voltage winding to provide either of two secondary voltages for greatest versatility. For full understanding of the capabilities of these components, the DC voltage and permissible currents have been listed for both choke and condenser input at both output voltages, as well as for military and **industrial** service.

Multiple Rating Filter Reactors:

Filter chokes have in the past been rated for one specific current value. To more fully meet today's electronic needs, the "H" series of filter chokes are designed and rated with inductance shown for four different current values. The **industrial** ratings are shown in bold type. In performance testing at our plant these units are 100% tested to exceed the inductance value specified at the maximum military current rating shown.



Class A insulation life based on continuous duty and ambient.



Measured rise on typical "H" series power component.

UTC HERMETIC SEALED POWER TRANSFORMERS

Primary 115 volts, 50/60 cycles . . . suited to 400/1000 cycle service.

MIL-T-27A RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

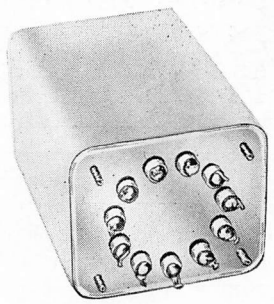
"L" ratings are for choke input filter, "C" for condenser input.

Type No.	HV Sec. C.T.	Approx* DC volts	DC MA	Fil. Wdg.	Approx* DC volts	MA DC	Fil. Wdg.	Case
H-80	450	C 235	20	6.3VCT-2A	**C 210**	**30**	**6.3VCT-2.5A**	FA
H-81	500	L 180	65	6.3VCT-3A 5V-2A	**L 170**	**75**	**6.3VCT-3A 5V-2A**	HA
		C 265	55		**C 240**	**65**		
	550	L 200	60		**L 190**	**70**		
		C 300	50		**C 280**	**60**		
H-82	540	L 180	110	6.3VCT-4A 5V-2A	**L 140**	**180**	**6.3VCT-4A 5V-2A**	JB
		C 280	65		**C 270**	**80**		
	600	L 200	100		**L 170**	**170**		
		C 325	60		**C 315**	**75**		
H-83	600	L 180	140	6.3V-5A 5V-2A	**L 160**	**190**	**6.3V-6A 5V-2A**	JA
		C 320	85		**C 270**	**115**		
	670	L 210	130		**L 190**	**180**		
		C 370	80		**C 340**	**105**		
H-84	700	L 255	170	6.3V-5A 6.3V-1A 5V-3A	**L 240**	**210**	**6.3V-6A 6.3V-1.5A 5V-4A**	KA
		C 400	110		**C 360**	**150**		
	750	L 275	160		**L 260**	**200**		
		C 420	105		**C 380**	**140**		
H-85	700	L 250	220	6.3V-6A 6.3V-1.5A 5V-3A	**L 235**	**260**	**6.3V-6A 6.3V-1.5A 5V-4A**	LA
		C 400	150		**C 355**	**195**		
	750	L 270	210		**L 255**	**250**		
		C 410	140		**C 375**	**185**		
H-86	720	L 240	260	6.3V-6A 6.3V-2A 5V-3A	**L 220**	**310**	**6.3V-7.5A 6.3V-2A 5V-4A**	MB
		C 425	170		**C 410**	**210**		
	790	L 270	250		**L 250**	**300**		
		C 450	160		**C 440**	**200**		
H-87	730	L 245	320	6.3V-6A 6.3V-2A 5V-4A	**L 210**	**420**	**6.3V-6A 6.3V-2A 5V-4A**	NB
		C 390	210		**C 350**	**310**		
	800	L 275	300		**L 245**	**400**		
		C 440	200		**C 400**	**300**		
H-88	800	L 280	300	6.3V-6A 6.3V-2A 5V-4A	**L 260**	**375**	**6.3V-7.5A 6.3V-2A 5V-4A**	NA
		C 420	190		**C 380**	**235**		
	1000	L 370	290		**L 350**	**350**		
		C 550	180		**C 510**	**225**		
H-89	850	L 320	320	6.3V-8A 6.3V-4A 5V-6A	**L 300**	**400**	**6.3V-8A 6.3V-4A 5V-6A**	OA
		C 510	280		**C 460**	**320**		
	1050	L 400	300		**L 380**	**375**		
		C 650	250		**C 600**	**300**		
H-90	700	L 230	140	6.3V-5A 5V-2A	**L 210**	**190**	**6.3V-6A 5V-3A**	JA
	850	L 290	130		**L 260**	**180**		
H-91	900	L 320	190	6.3V-5A 6.3V-1A 5V-3A	**L 290**	**270**	**6.3V-6A 6.3V-1.5A 5V-4A**	KA
	1000	L 360	180		**L 320**	**250**		
H-92	900	L 330	230	6.3V-6A 6.3V-2A 5V-4A	**L 320**	**290**	**6.3V-8A 6.3V-2A 5V-4A**	MB
	1050	L 385	220		**L 370**	**270**		
H-93	1000	L 370	280	6.3V-8A 6.3V-4A 5V-6A	**L 340**	**340**	**6.3V-10A 6.3V-5A 5V-6A**	OA
	1200	L 465	250		**L 455**	**300**		

* After appropriate H series choke.

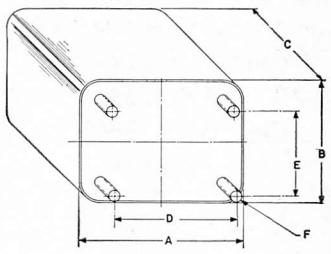
The "H" series of hermetic power transformers are suited to a wide variety of electronic applications in both military and **industrial** service. Conservative design provides maximum reliability through low temperature rise and high insulation safety factors. All units are in MIL cases **with rugged internal construction, stainless steel studs.**

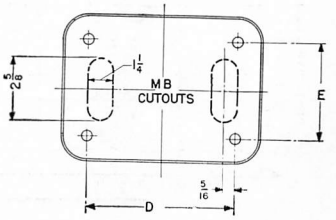
The tapped high voltage winding provides either of two secondary voltages for greatest versatility. The listings indicate DC voltages and permissible currents for both choke and condenser input filters, as well as for military and **industrial** applications (see page 11).



DIMENSIONS, "H" SERIES POWER TRANSFORMERS, INCHES

Case No.	A	B	C	D	E	F	Cutout, Centered	Wt. Lbs.
FA	2 5/16	2 1/16	3⅛	1 11/16	1 7/16	6—32	1½ Dia.	1½
HA	3 1/16	2⅝	4¼	2 19/64	1 55/64	8—32	2¼ Dia.	4
JA	3 9/16	3 1/16	4⅞	2⅝	2⅛	8—32	2⅝ Dia.	6
JB	3 9/16	3 1/16	3⅞	2⅝	2⅛	8—32	2¼ Dia.	5
KA	3 15/16	3⅜	5¼	3	2 7/16	10—32	2 9/16 Sq.	8½
LA	4 5/16	3 11/16	5 9/16	3 5/16	2 11/16	10—32	2 9/16 Sq.	10
MB	4 11/16	4	4 15/16	3 11/16	3	¼—20	See Cut	12
NA	5 1/16	4 5/16	6 13/16	4 1/16	3 5/16	¼—20	2⅞ Dia.	18
NB	5 1/16	4 5/16	5½	4 1/16	3 5/16	¼—20	2⅞ Dia.	16
OA	5½	4½	6¾	3¾	3	¼—20		21½





UTC HERMETIC SEALED FILTER CHOKES

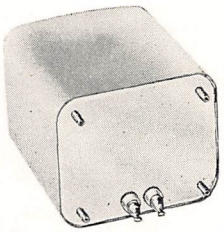
MIL-T-27A RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

Type No.	Ind. Hys.	@ MA DC	Ind. Hys.	@ MA DC	Ind. Hys.	@ MA DC	Ind. Hys.	@ MA DC	Res. Ohms	Max. DCV* Ch. Input	Test V. RMS	Case
H-70	20	20	18	25	14.5	30	10	35	925	350	1000	AH
H-71	20	40	18.5	50	15.5	60	10	70	350	500	2500	FB
H-72	13	70	11.5	85	9.5	105	7	125	215	500	2500	GB
H-73	11	100	9.5	125	7.5	150	5.5	175	150	700	2500	HB
H-74	11	150	10	170	8.5	195	**6.5**	**215**	135	700	2500	JB
H-75	11	200	10	230	8.5	250	**6.5**	**300**	90	700	2500	KB
H-76	11	200	10	230	8.5	250	**6.5**	**300**	85	1500	4500	LB
H-77	10	300	9	350	**8**	**390**	**6.5**	**435**	60	2000	5500	MB
H-78	7	400	**6.5**	**430**	**6**	**465**	**5.5**	**500**	48	2500	7000	OA
H-79	7	800	6.5	900	6	1000	**5.5**	**1250**	20	3000	9000	7x7x8

Inductance test is performed at maximum military current rating.

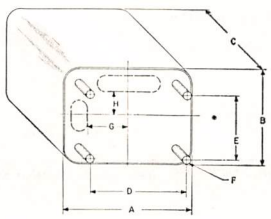
* Based on maximum ripple voltage across choke in choke input filter circuit, in terms of DC output voltage. Does not apply to condenser input circuits.

The multiple ratings for the "H" series of filter chokes suit these units for the complete gamut of military and **industrial** applications. Conservative design provides maximum reliability through low temperature rise and high insulation safety factor. All units employ rugged internal construction and MIL cases (except H-79 which has mounting opposite terminals), stainless steel studs.



DIMENSIONS "H" SERIES FILTER CHOKES, INCHES

Type No.	A	B	C	D	E	F	G	H	Cutout	Wt. Lbs.
H-70	1 5/16	1 5/16	1¾	1¼ diagonal		6–32(2)		5/16	3/8 x 5/8	.4
H-71	2 5/16	2 1/16	2½	1 1/16	1 7/16	6–32		15/32	½ x 1¼	1½
H-72	2¾	2⅜	2 1/16	2⅛	1¾	6–32		17/32	½ x 7/8	2½
H-73	3 1/16	2⅝	3 1/16	2 19/64	1 55/64	8–32		⅝	⅝ x 1⅛	3½
H-74	3 1/16	3 1/16	3⅞	2⅝	2⅛	8–32		¾	⅝ x 1⅛	5
H-75	3 5/16	3⅜	4 5/16	3	2 7/16	10–32	1 5/16		⅝ x 1 5/16	8
H-76	4 5/16	3 1/16	4½	3 5/16	2 1/16	10–32	1⅝		1/16 x 1 5/16	11
H-77	4 1/16	4	4 5/16	3 1/16	3	¼–20	1½		1 1/16 x 1¼	15
H-78	5½	4½	6¾	3¾	3	¼–20			1 x 2	25
H-79	7	7	8	5⅞	5⅞	⅜–16(6)			term. opp. mtg.	60



UTC HERMETIC SEALED FILAMENT TRANSFORMERS

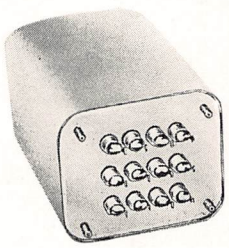
Primary: 105/115/210/220 volts . . . 50/60 cycles, except H-130 (115 v.) and H-131 (115/220 v.)

Suited to 400/1000 cycle service.

MIL-T-27A RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

Type No.	Sec. Volts	Amps. (MIL)	Amps. (Indust.)	Test Volts RMS	Case
H-120	2.5	10	**12**	4000	GB
H-121	2.5	10	**12**	10000	JB
H-122	2.5	20	**26**	10000	KB
H-123	2.5	5	**7.5**	10000	NB
	2.5	5	**7.5**		
	2.5	10	**15**		
H-124	5	3	**3**	2000	FB
H-125	5	10	**12**	10000	KB
H-126	5	20	**25**	10000	LA
H-127	5	20	**30**	21000	NA
H-128	5	60	**75**	21000	5½x6½x7¾
H-129	5	10	**12**	21000	5½x6½x7¾
	5	10	**12**		
	5	20	**24**		
H-130	6.3CT	.6	**.75**	1500	AJ
H-131	6.3CT	2	**2.5**	2500	FB
H-132	6.3CT	6	**7**	2500	JA
	6.3CT	6	**7**		
H-133	6.3CT	7	**8**	2500	HB
H-134	6.3CT	10	**12**	2500	HA
H-135	10CT	10	**13**	2500	JB
H-136	14, 12, 11CT	10	**14**	2500	LA

The wide variety of "H" series filament transformers listed cover virtually every military and **industrial** need. Conservative design provides maximum reliability through low temperature rise and high insulation safety factor. Except for H-128 and H-129 which have terminals opposite mounting, all units are in MIL cases with rugged internal construction, stainless steel studs. Regulation has been a fundamental design consideration to provide for the diverse applications in which these units may be employed.



UTC HERMETIC SEALED PLATE TRANSFORMERS

Primary: 105/115/210/220 Volts . . . 50/60 cycles.

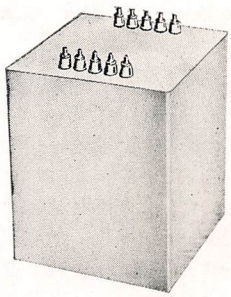
MIL-T-27A RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

All ratings are for choke input filter.

No. Type	Sec. V. C.T.	Approx.* DC volts	MA DC	Choke No.	MA DC	Choke No.	Case
H-110	1050	365	275	H-75	**385**	**H-77**	MB
	1200	430	250	H-75	**350**	**H-77**	
H-111	1050	415	440	H-77	**550**	**H-77**	NA
	1200	480	400	H-77	**500**	**H 77**	
H-112	1500	615	290	H-77	**350**	**H-77**	NA
	1900	790	250	H-76	**300**	**H-76**	
H-113	2500	1050	280	H-77	**340**	**H-77**	6 x 5⅛ x 6¾
	3000	1275	250	H-76	**300**	**H-76**	
H-114	2500	1050	450	H-79	**500**	**H-78**	6¾ x 6½ x 8
	3000	1265	400	H-78	**450**	**H-78**	
H-115	3500	1500	265	H-77	**350**	**H-77**	6¾ x 6½ x 8
	4400	1900	225	H-77	**300**	**H-77**	
H-116	5000	2125	450	H-79	**560**	**H-79**	8½ x 9¾ x 10¼
	6000	2550	400	H-78	**500**	**H-78**	
H-117	5000	2125	900	H-79	**1100**	**H-79**	11 x 11 x 14¾
	6000	2550	800	H-79	**1000**	**H-79**	

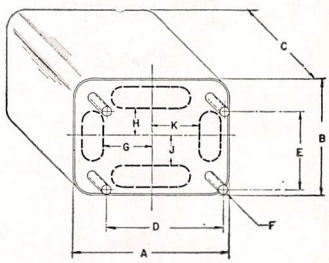
*After filter choke.

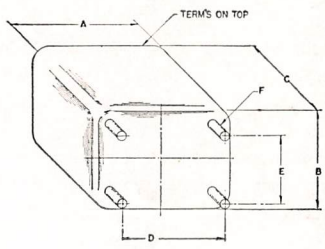
The tapped high voltage winding on the "H" series hermetic plate transformers provides either of two secondary voltages for greatest versatility. The listing shows the DC voltage and permissible currents for a wide variety of applications in both military and **industrial** service. High insulation safety factor and low temperature rise provide a maximum in reliability. The first three types are in MIL cases. The others are in rectangular cases with terminals opposite mounting for greatest convenience in typical power supply application, stainless steel studs.



DIMENSIONS "H" SERIES PLATE AND FILAMENT TRANSFORMERS, INCHES

Type No.	A	B	C	D	E	F	G	H	J	K	Cutout	Cutout	Wgt. Lbs.
H-110	4 1/16	4	4 1/16	3 1/16	3	¼–20	1⅜			1⅜	G 13/16 x 2⅜	K 13/16 x 2⅜	14
H-111	5 1/16	4 5/16	6 13/16	4 1/16	3 5/16	¼–20		1 3/16	1 5/16		H ⅞ x 3¼	J ⅝ x 3	19
H-112	5 1/16	4 5/16	6 13/16	4 1/16	3 5/16	¼–20		1 3/16	1 5/16		H ⅞ x 3¼	J ⅝ x 3	19
H-113	6	5⅛	6¾	5	4 5/16	¼–20	1 13/16			1 13/16	G ¾ x 2⅞	K 13/16 x 3½	27
H-114	6¾	6½	8	5⅝	5⅛	⅜–16					top term.		51
H-115	6¾	6½	8	5⅝	5⅜	⅜–16					top term.		48½
H-116	9¾	8½	10¼	7¾	7¼	⅜–16(6)					top term.		95
H-117	11	11	14¾	8⅜	8⅜	⅝–11					top term.		160
H-120	2¾	2⅜	2 13/16	2⅛	1¾	6–32		5/16	⅜		H ¾ x 1⅛	J 9/16 x 2	2½
H-121	3 5/16	3 1/16	3⅞	2⅝	2⅛	8–32	⅝			⅛	G ⅝ x 2	K 1⅜ x 2⅛	4½
H-122	3 13/16	3⅜	4 5/16	3	2 7/16	10–32	1			5/16	G ⅝ x 2	K 1⅜ x 2⅛	6
H-123	5 1/16	4 5/16	5½	4 1/16	3 5/16	¼–20					3¼ x 4⅜	centered	13
H-124	2 5/16	2 1/16	2½	1 11/16	1 7/16	6–32		⅜	7/16		H 5/16 x 1¼	J ½ x 1⅜	2
H-125	3 15/16	3⅜	4 5/16	3	2 7/16	10–32	1			5/16	G ⅝ x 2	K 1⅜ x 2⅛	6
H-126	4 5/16	3 11/16	5 9/16	3 5/16	2 11/16	10–32		⅞	5/16		H 13/16 x 2⅝	J 1⅜ x 2⅜	10
H-127	5 1/16	4 5/16	5½	4 1/16	3 5/16	¼–20					top term.		17
H-128	6½	5½	7¾	5⅜	4⅜	⅜–16					top term.		34
H-129	6½	5½	7¾	5⅜	4⅜	⅜–16					top term.		28
H-130	1⅝	1⅝	2⅜	1 5/16	1 5/16	6–32					1¼ Dia.	centered	.65
H-131	2 5/16	2 1/16	2½	1 11/16	1 7/16	6–32		⅜	⅜		H 9/16 x 1¼	J 9/16 x 1¼	1½
H-132	3 9/16	3 1/16	4⅞	2⅝	2⅛	8–32					2⅜ x 2⅛	centered	6
H-133	3 1/16	2⅝	3 5/16	2 19/64	1 55/64	8–32		⅝	⅝		H ⅝ x 1⅝	J ⅝ x 2	3½
H-134	3 1/16	2⅝	4¼	2 19/64	1 55/64	8–32		⅜	⅜		H ¾ x 1⅝	J ⅝ x 2	4½
H-135	3 9/16	3 1/16	3⅞	2⅝	2⅛	8–32	1/16			¾	G ¾ x 1¾	K ⅞ x 1⅝	6
H-136	4 5/16	3 11/16	5 9/16	3 5/16	2 11/16	10–32					2⅞ Dia.	centered	11





MAGNETIC AMPLIFIERS FOR SERVO MOTOR APPLICATIONS

(Hermetically sealed to MIL-T-27A Specs.)

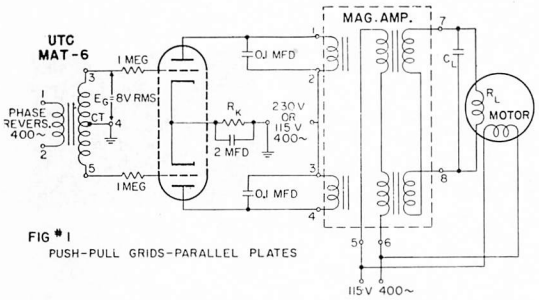


FIG # 1
PUSH-PULL GRIDS-PARALLEL PLATES

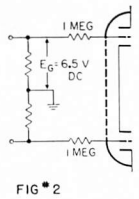


FIG # 2
GRID CIRCUIT
MODIFICATION FOR
DC INPUT

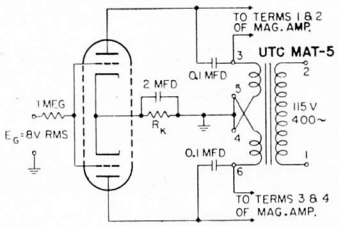


FIG # 3
PARALLEL GRIDS-PUSH-PULL PLATES

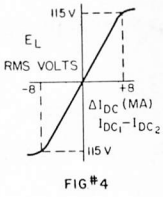
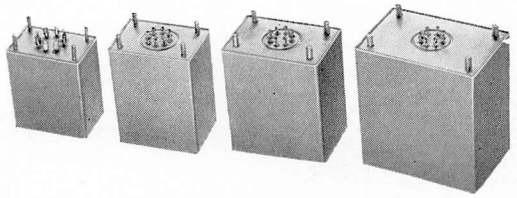


FIG # 4



The MAT 1-4 Magnetic Amplifiers are exceptionally stable units designed for the control of 2 phase, 115V., 400 cycle servo motors. They are compact . . . hermetically sealed . . . magnetically shielded . . . and meet MIL-T-27 and MIL-E-5400 Specifications. The output is sinusoidal, amplitude variable, and phase reversible. Control is provided by a dual triode such as 12AU7 operating with a plate voltage of 115 volts, 400 cycles, or higher. The signal to the triode grids can be polarity reversible DC or phase reversible 400 cycles with or without suppressed carrier modulation. These units eliminate DC power requirements as well as temperature sensitive dry disc rectifiers. The high input impedance provides minimum loading on sensing elements and high power gain. Ringing at low load level has been reduced to a minimum through high internal damping factors. The power output figures are conservative . . . power gain of the MAGNETIC STRUCTURE is approximately 40 . . . response time approximately 7.5 milliseconds. The maximum null voltage is 3 volts RMS. For single phase supply voltage the load capacitor should effect 90° phase shift with motor load . . . for 3 phase, 30° phase shift. (The chart values shown are approximate.)

For AC signal control the circuit of Figure 1 is employed. For DC signal control Figure 2 applies. Figure 3 shows the use of a power transformer (MAT-5) which provides higher plate voltages and eliminates the input transformer (MAT-6). The typical response curve of Figure 4 applies to all units, the larger units feeding heavier loads.

TYPE NO.	MAT-1	MAT-2	MAT-3	MAT-4
230 Volt Supply				
Power output	4 W.	8 W.	11 W.	18 W.
RL, ohms	3300	1600	1200	720
CL, mfd.	.2	.3	.5	.7
115 Volt Supply				
Power output	2 W.	4 W.	6 W.	9 W.
RL, ohms	6500	3300	2200	1450
CL, mfd.	.13	.2	.3	.45
Reson. Freq.	40 cyc.	35 cyc.	35 cyc.	20 cyc.
Log-Decr.	.18	.23	.03	.65
Cont. Wdg. Res.	6200 ohms	8450 ohms	4750 ohms	5650 ohms
Case				
Length, In.	1¼	1½	1¾	2⅛
Width, In.	1 5/16	2⅛	2½	3⅛
Height, In.	2 5/16	2¾	2 5/16	3⅜
Mtg. Dim., In.	13/16 x 1½	1 x 1⅝	1⅛ x 1⅞	1½ x 2½
Studs, stainless	4-40	6-32	8-32	8-32
Cutout, in.	1	1	1	1
Unit Weight, lbs.	.67	1.1	1.7	2.75

MAT-5 115V.-400 cyc. to 460 VCT; provides 230V. 48 MA DC or 460V. 24 MA DC. RC-37 Case . . . 1⅜ x 1⅜ x 1⅝ . . . ⅛ mtg. holes 1⅛ x 1⅛ . . . 6 oz.

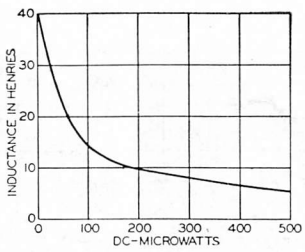
MAT-6 Input . . . 10,000 ohms pri. . . . 1:15 C.T. ratio . . . phase shift under 1° . . . RC-25 case.

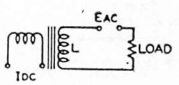
SPECIAL MAGNETIC AMPLIFIERS AND SATURABLE REACTORS

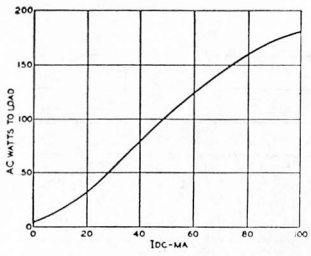
UTC manufactures a wide variety of saturable reactors, magnetic amplifiers, and other saturable devices, to customers specifications. Power frequency ranges run from microwatts to 5KVA. High frequency units range from kilocycles to 100 MC. The curves below illustrate a few of the special units available.

MAGNETIC AMPLIFIERS

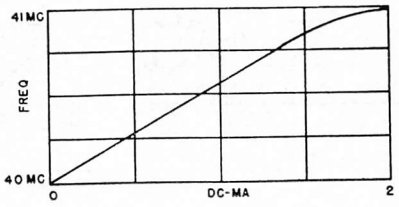
Magnetic amplifiers are used extensively for both power control and phase control. The left curve shown is that of a sensitive saturable reactor structure controllable with powers below .5 milliwatt. The right curve is that of a moderate size power control reactor indicating power to the load with saturating DC.

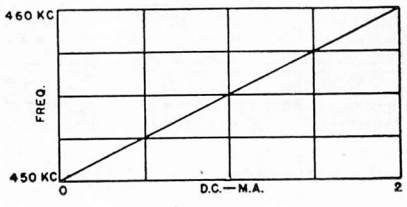






The curves at right illustrate oscillator frequency variation using two types of RF inductors varied by the amount of DC through the controlled windings. These units are available in ouncer size and smaller.

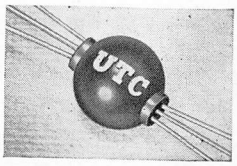


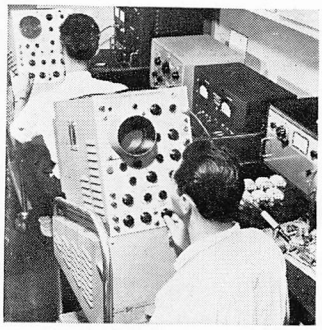


MINIATURE WIDE APPLICATION PULSE TRANSFORMERS

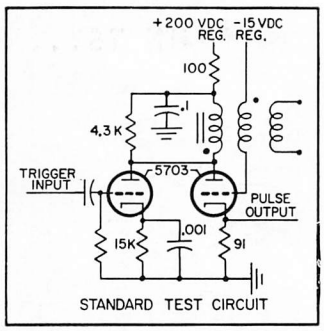
UTC miniature, wound core, pulse transformers are suited to a wide variety of blocking oscillator, interstage, and low level modulator applications. The high reliability design includes hermetic sealing by vacuum molding in a special epoxy . . . meets full MIL-T-27 specifications . . . is suitable for service from —70° C to +130° C.

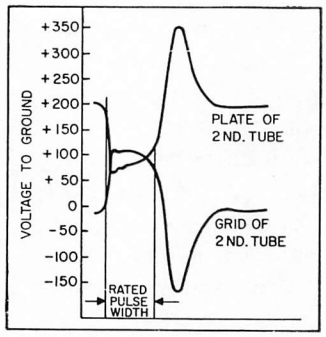
For most versatile use, all stock items provide 3 windings of equal (1:1:1) ratio. Two winding, tapped winding, other ratio types, and metal cased units are available on special order. The short rise time of these items is illustrated by the .05 μsec. rise time of the H-50. Insulation test is at 1250 volts RMS.





Testing small pulse transformers.





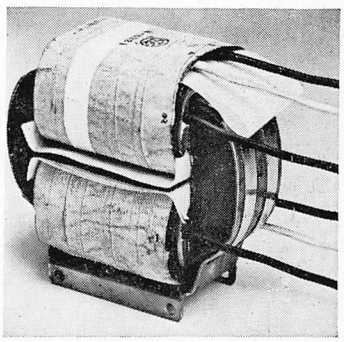
1:1:1 PULSE TRANSFORMERS

Type No.	Pulse Width μsec.	Width In.	Length In.
H-45	.05	3/8	3/8
H-46	.1	3/8	3/8
H-47	.2	19/32	5/8
H-48	.5	19/32	5/8
H-49	1	19/32	5/8
H-50	2	19/32	5/8
H-51	3	19/32	5/8
H-52	5	19/32	5/8
H-53	7	21/32	5/8
H-54	10	21/32	5/8
H-55	16	21/32	5/8
H-56	20	21/32	5/8
H-57	25	21/32	5/8

SPECIAL PULSE TRANSFORMERS

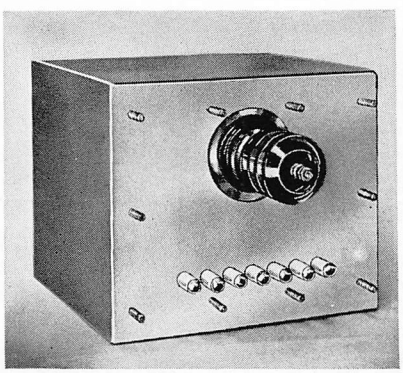
UTC supplies to manufacturers a complete range of pulse transformers from 1/10th ounce blocking oscillator units to resonant charging inductors and pulse transformers up to 10 megawatts peak power . . . pulse lengths from .1 to 100 microseconds. Units are designed to MIL-T-27 or special airborne requirements.

These components as supplied by UTC do not depend on uniformity of structure alone for full performance, as each unit is 100% tested in a setup simulating actual use and fully proved to meet all requirements. To assure the high quality level resulting from this test approach, all inquiries for special pulse units should include the full circuit details of the application, as well as the desired performance characteristics.

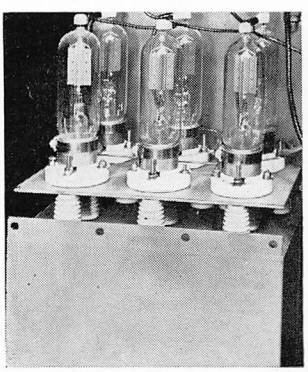


High power pulse transformer ready for oil filled housing.

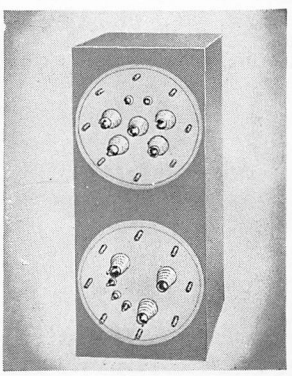
Testing large pulse transformers.



Output transformers for positioning servo-motor of radar antenna.



Filament transformer tube socket combination for use in high voltage supply of large radar unit.



Three phase plate and filament transformer for high power radar set.

HERMETICALLY SEALED COMPONENTS

For over fifteen years UTC has been the largest supplier of transformer components for military applications, to customer specifications. Listed below are a number of types, to MIL-T-27A specifications, which are now catalogued as UTC stock items.

Terminals on items H-20 through H-24 are neoprene-ceramic assemblies. All other units employ glass bead headers, but can be supplied with neoprene-ceramic terminals where required. **For printed circuit use,** wire terminals on glass header units can be straightened out without injury. Straight wire terminals available on production orders.

The **frequency response ratings** are based on military requirements. Actually, most of the units that do not carry DC are appreciably better in response than the range shown.

The **level ratings** are maximum level for reasonable distortion at the lowest frequency specified. For higher frequencies considerably higher levels are permissible.

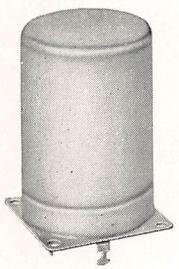
The **impedance ratings** are listed in standard manner. Obviously, a transformer with a 15,000 ohm primary impedance can operate from a tube representing a source impedance of 7700 ohms, etc. In addition, transformers can be used for applications differing considerably from those shown, keeping in mind that impedance ratio is constant. Lower source impedance will improve response and level ratings . . . higher source impedance will reduce frequency range and level rating.

RC-25 CASE

Length ..... 1 3/32"
Width 61/64
Height ..... 1 9/16"
Mounting (slot centers) 1⅛ to 1 7/32"
Screws ..... 4-40 Fil.
Cutout ..... ⅞ Dia.
Unit Weight ..... 1.5 oz.

MINIATURE AUDIO UNITS . . . RC-25 CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm
H-1	Mike, pickup, line to grid	TF1A10YY	50, 200 CT, 500 CT*	50,000	0	50-10,000	+ 5
H-2	Mike to grid	TF1A11YY	82	135,000	50	250-8,000	+21
H-3	Single plate to single grid	TF1A15YY	15,000	60,000	0	50-10,000	+ 6
H-4	Single plate to single grid, DC in Pri.	TF1A15YY	15,000	60,000	4	200-10,000	+14
H5	Single plate to P.P. grids	TF1A15YY	15,000	95,000 CT	0	50-10,000	+ 5
H-6	Single plate to P.P. grids, DC in Pri.	TF1A15YY	15,000	95,000 split	4	200-10,000	+11
H-7	Single or P.P. plates to line	TF1A13YY	20,000 CT	150/600	4	200-10,000	+21
H-8	Mixing and matching	TF1A16YY	150/600	600 CT	0	50-10,000	+ 8
H-9	82/41:1 input to grid	TF1A10YY	150/600	1 meg.	0	200-3,000 (4 db.)	+10
H-10	10:1 single plate to single grid	TF1A15YY	10,000	1 meg.	0	200-3,000 (4 db.)	+10
H-11	Reactor	TF1A20YY	300 Henries-0 DC, 50 Henries-3 Ma. DC, 6,000 Ohms.				



RC-50 CASE

Length 1⅝
Width 1⅝
Height 2 5/16
Mounting 1 5/16
Screws ..... #6-32
Cutout ..... 1½ Dia.
Unit Weight ..... 8 oz.

COMPACT AUDIO UNITS . . . RC-50 CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm
H-19	Line to grid. Balanced, center tapped primary . . . 1:14 ratio. Multiple hi-permalloy (75 DB) shielding	TF1A10YY	250 CT 500 CT	50,000 100,000	0	30-20,000	+ 6
H-20	Single plate to 2 grids, can also be used for P.P. plates	TF1A15YY	15,000 split	80,000 split	0	30-20,000	+12
H-21	Single plate to P.P. grids, DC in Pri.	TF1A15YY	15,000	80,000 split	8	100-20,000	+23
H-22	Single plate to multiple line	TF1A13YY	15,000	50/200, 125/500**	8	50-20,000	+23
H-23	P.P. plates to multiple line	TF1A13YY	30,000 split	50/200, 125/500**	8 BAL.	30-20,000	+19
H-24	Reactor	TF1A20YY	450 Hys.-0 DC, 250 Hys.-5 Ma. DC, 6000 ohms 65 Hys.-10 Ma. DC, 1500 ohms				

SM CASE

Length 1 1/16
Width ..... ½
Height 2 9/32
Screw ..... 4-40 Fil.
Unit Weight ..... 8 oz.

SUBMINIATURE AUDIO UNITS . . . SM CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm
H-30	Input to grid	TF1A10YY	50***	62,500	0	150-10,000	+13
H-31	Single plate to single grid, 3:1	TF1A15YY	10,000	90,000	0	300-10,000	+13
H-32	Single plate to line	TF1A13YY	10,000****	200	3	300-10,000	+13
H-33	Single plate to low impedance	TF1A13YY	30,000	50	1	300-10,000	+15
H-34	Single plate to low impedance	TF1A13YY	100,000	60	.5	300-10,000	+ 6
H-35	Reactor	TF1A20YY	100 Henries-0 DC, 50 Henries-1 Ma. DC, 4,400 ohms.				
H-36	Transistor Interstage	TF1A15YY	25,000 (DCR800)	1,000 (DCR110)	.5	300-10,000	+10
H-37	Transistor output	TF1A15YY	500 (DCR50)	50 (DCR5)	3.5	300-10,000	+15

* 200 ohm termination can be used for 150 ohms or 250 ohms, 500 ohm termination can be used for 600 ohms.

** 200 ohm termination can be used for 150 ohms or 250 ohms, 125/500 ohm termination can be used for 150/600 ohms.

*** can be used with higher source impedances, with corresponding reduction in frequency range. With 200 ohm source, secondary impedance becomes 250,000 ohms . . . loaded response is —4 db. at 300 cycles.

**** Can be used for 500 ohm load . . . 25,000 ohm primary impedance . . . 1.5 Ma. DC.

UTC Deci-Ouncer Transformers... DOTS FOR SHORT

REVOLUTIONARY TRANSISTOR* TRANSFORMERS

UTC has been the leader in miniaturization for over twenty years. In view of this, it was surprising to many people that UTC did not quickly bring out a series of transformers designed for use and comparable in size to transistors. Unfortunately, extremely miniature transistor transformers of standard construction had poor general characteristics, poor reliability characteristics, and were woefully inadequate for a large number of applications. Instead, UTC started a development program to evolve a new transistor transformer structure designed to provide full performance in extremely miniature size. The culmination of this development is found in the new DOT series**. Listed below are the standard types of DOTS now being made and curves showing their general characteristics in typical transistor application. To fully appreciate the unprecedented performance of these revolutionary transistor transformers, the curves also show characteristics of similar size units now on the market.

Special DOT units (some even smaller in size) are available on production order.

Type No.	Application	Level Mw.	Pri. Imp.	D.C. Ma.‡ in Pri.	Pri. Res.	Sec. Imp.
DOT-1	Interstage	50	20,000 30,000	.5 .5	850	800 1200
DOT-2	Output	100	500 600	3 3	60	50 60
DOT-3	Output	100	1000 1200	3 3	115	50 60
DOT-4	Output	100	600	3	60	3.2
DOT-5	Output	100	1200	2	115	3.2
DOT-6	Output	100	10,000	1	1000	3.2
DOT-7	Input	25	200,000	0	8500	1000
DOT-8	Reactor 3.5 Hys. @ 2 Ma. DC				630	
DOT-9	Output or driver	100	10,000 12,500	1 1	930	500 CT 600 CT
DOT-10	Driver	100	10,000 12,500	1 1	930	1200 CT 1500 CT
DOT-11	Driver	100	10,000 12,500	1 1	930	2000 CT 2500 CT
DOT-12	Single or PP output	500	150 CT 200 CT	10 10	11	12 16
DOT-13	Single or PP output	500	300 CT 400 CT	7 7	20	12 16
DOT-14	Single or PP output	500	600 CT 800 CT	5 5	43	12 16
DOT-15	Single or PP output	500	800 CT 1070 CT	4 4	51	12 16
DOT-16	Single or PP output	500	1000 CT 1330 CT	3.5 3.5	71	12 16
DOT-17	Single or PP output	500	1500 CT 2000 CT	3 3	108	12 16
DOT-18	Single or PP output	500	7500 CT 10,000 CT	1 1	505	12 16
DOT-19	Output to line	500	300 CT	7	19	600
DOT-20	Output or matching to line	500	500 CT	5.5	31	600
DOT-21	Output to line	500	900 CT	4	53	600
DOT-22	Output to line	500	1500 CT	3	86	600

‡DCMA shown is for single ended useage (under 5% distortion—100MW—1KC) . . . for push pull, DCMA can be any balanced value taken by .5W transistors (under 5% distortion—500MW—1KC)

High Power Rating . . . up to 100 times greater.

Excellent Response . . . twice as good at low end.

Low Distortion . . . reduced 80%.

High Efficiency . . . up to 30% better.

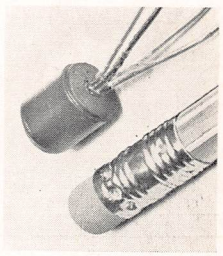
Moisture Proof . . . processed to hermetic specs.

Rugged . . . completely cased.

Anchored Leads . . . will withstand 10 pound pull test.

Printed Circuit Use . . . (solder melting) plastic insulated leads.

ACTUAL SIZE

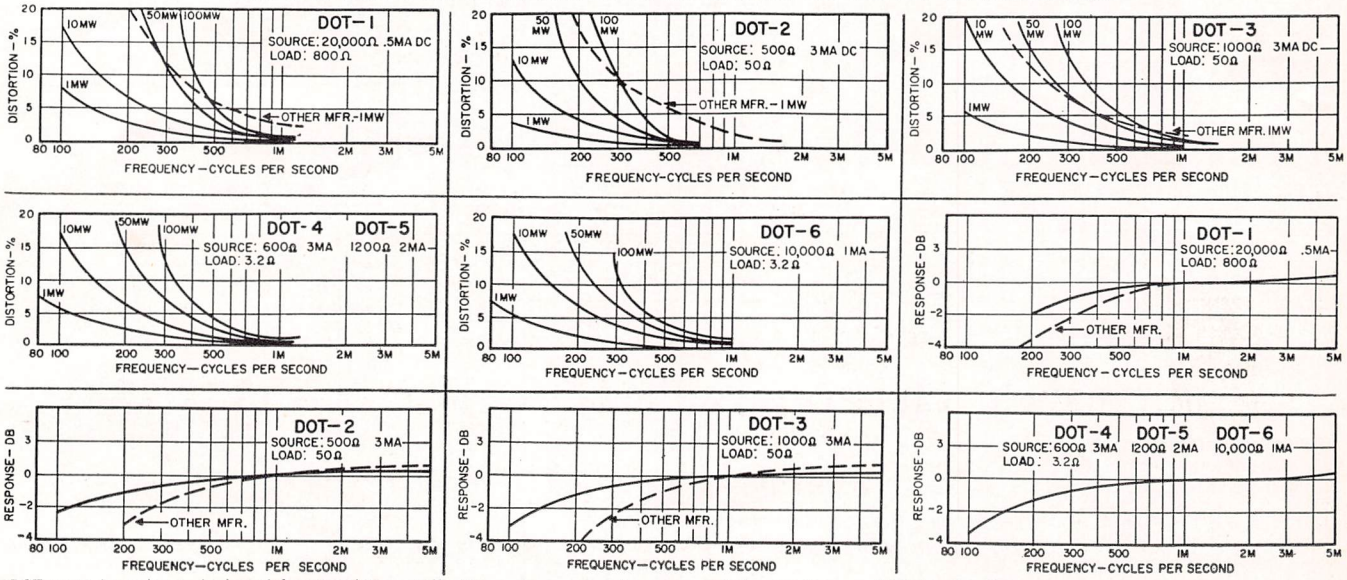


DOT CASE

Dia. . . . 5/16"
Length . . 13/32"
Weight . . 1/10th oz.

TYPICAL DOT PERFORMANCE CURVES

Power curves based on setting output power at 1 KC, then maintaining same input level over frequency range.



*DOT units have been designed for transistor application only . . . not for vacuum tube service. **Pats. Pending

OUNCER AUDIO UNITS

STANDARD AND PLUG-IN TYPES

UTC OUNCER components represent the acme in compact quality transformers. These units, which weigh one ounce, are fully impregnated and sealed in a drawn aluminum housing 7/8" diameter . . . mounting opposite terminal board.

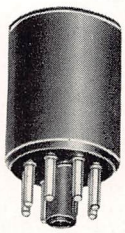
Ouncer items are ideal for portable broadcast, hearing aid, aircraft, concealed service, and similar applications. High fidelity characteristics are provided, uniform within approximately 1 DB from 30 to 20,000 cycles, except for 0-14, 0-15, and units carrying DC which are intended for voice frequencies. Maximum level +8 dbm.

"P" series units are identical to the UTC OUNCER units but are sealed in bakelite housings with plug-in base to fit standard octal socket. While of submersion proof design, these units weigh but two ounces. Oversize pins in the base make it impossible to dislodge these units from their sockets.

OUNCER Type No.	Application	Pri. Imp.	Sec. Imp.	PLUG-IN Type No.
0-1	Mike, pickup or line to 1 grid	50, 200/250, 500/600	50,000	P-1
0-2	Mike, pickup or line to 2 grids	50, 200/250, 500/600	50,000	P-2
0-3	Dynamic mike to 1 grid	7.5/30	50,000	P-3
0-4	Single plate to 1 grid	15,000	60,000	P-4
0-5	Single plate to 1 grid, D.C. in Pri.	15,000	60,000	P-5
0-6	Single plate to 2 grids	15,000	95,000	P-6
0-7	Single plate to 2 grids, D.C. in Pri.	15,000	95,000	P-7
0-8	Single plate to line	15,000	50, 200/250, 500/600	P-8
0-9	Single plate to line, D.C. in Pri.	15,000	50, 200/250, 500/600	P-9
0-10	Push pull plates to line	30,000 ohms plate to plate	50, 200/250, 500/600	P-10
0-11	Crystal mike or pick-up to line	50,000	50, 200/250, 500/600	P-11
0-12	Mixing and matching	50, 200/250	50, 200/250, 500/600	P-12
0-13	Reactor, 300 Hys.—no D.C.;	50 Hys.—3 MA. D.C.,	6000 ohms	P-13
0-14	50:1 mike or line to 1 grid	200	½ megohm	P-14
0-15	10:1 single plate to 1 grid	15,000	1 megohm	P-15
0-16	Mike or line to grid	250 C.T.	50,000	
	This transformer provides very low hum pickup . . . employs two heavy gauge hipermalloy shields plus orientable mounting. Primary centertap is balanced to 1%. Can be used for 150, 200, 250, 500, or 600 ohm sources . . . 200:1 impedance ratio.			
0-17	Mumetal shield, slip fit over ouncer, 1" O.D., provides 25 db shielding.			

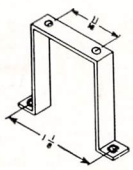
OUNCER CASE

Dia. ..... 7/8"
Ht. ..... 1 3/16"
Mtg. ..... 1 1/16"
Scr. 2-56
Wt. ..... 1 oz.

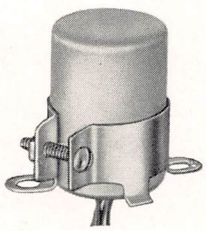


PLUG-IN CASE

Dia. ..... 1 3/32"
Ht. ..... 1 15/32"
Skt. ..... St. Oct.
Wt. ..... 2 oz.

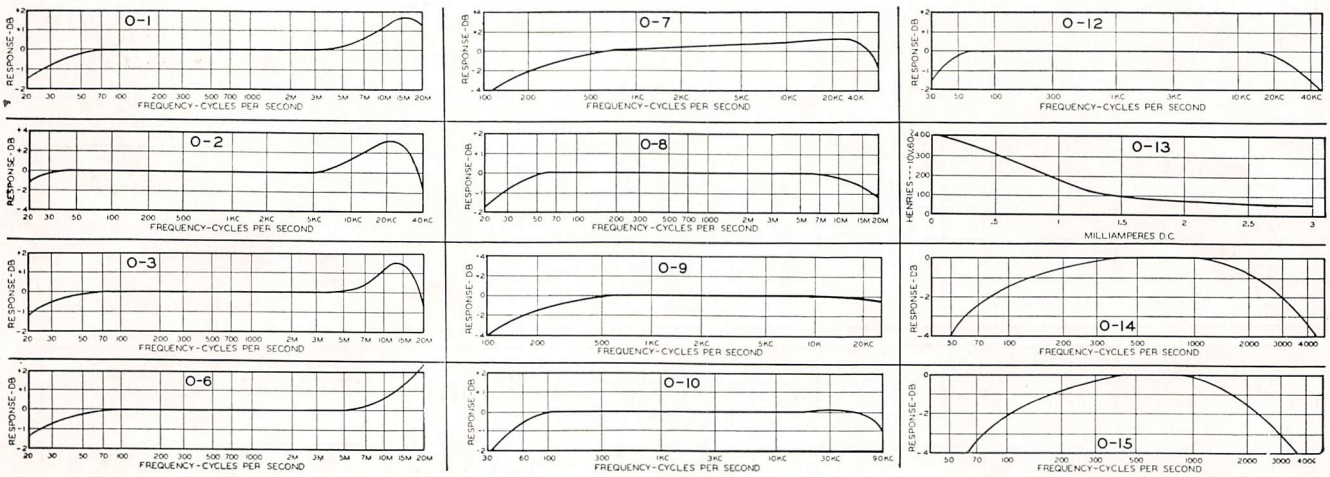


Ouncer chassis mount bracket available on production orders



0-16 CASE

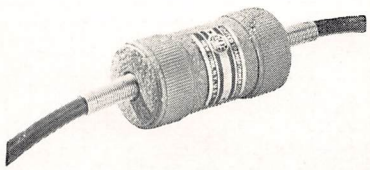
Dia. ..... 1 1/16"
Ht. ..... 1 1/2"
Mtg. ..... 1 1/2"
Scr. 6-32
Wt. ..... 3 oz.
Clamp ..... 1 5/16" x 1 7/8"



MICROPHONE CABLE TRANSFORMERS

UTC Cable transformers are designed to be inserted in the cable circuit, and are ruggedly constructed to withstand mechanical abuse. The cable connections (supplied less cable) are made through spring strain relief to terminal boards inside the end caps. 1½" diameter . . . 2½" long . . . ½ lb.

Type MC-1—primary tapped 30/50 and 200/250 ohms, secondary to grid, standard fidelity.
Type MC-2—primary tapped 30/50 and 200/250 ohms, secondary to grid, high fidelity.



SUBOUNCER UNITS

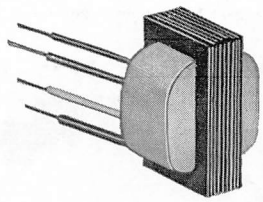
UTC Sub-Ouncer units fulfill an essential requirement for miniaturized components having relatively high efficiency and wide frequency response. Through the use of special nickel iron core materials and winding methods, these miniature units have performance and dependability characteristics far superior to any other comparable items. They are ideal for hearing aids, miniature radios, and other types of miniature electronic equipment.

The coils employ automatic layer windings of double Formex wire . . . in a molded Nylon bobbin. All insulation is of cellulose acetate. Four inch color coded flexible leads are employed, securely anchored mechanically. No mounting facilities are provided, since this would preclude maximum flexibility in location. Units are vacuum impregnated and double (water proof) sealed. The curves below indicate the excellent frequency response available.

Available hermetically sealed on production orders (SOM case 1 1/16 x 1 3/16 x 1 1/8).

Type	Application	Max. Level dbm	Pri. Imp. ohms	MA D.C. in Pri.	Sec. Imp. ohms	Pri. Res. ohms	Sec. Res. ohms
*SO-1	Input	+10	200 50	0	250,000 62,500	* 16	2500
SO-2	Interstage/3:1	+20	10,000	0-.25	90,000	215	1850
*SO-3	Plate to Line	+23	10,000 25,000	3 1.5	200 500	1225	30
SO-4	Output	+23	30,000	1.0	50	1850	3.8
SO-5	Reactor 50 HY at 1 mil. D.C. 2675 ohms D.C. Res.						
SO-6	Output	+23	100,000	.5	60	3400	3.7
SO-7	Transistor Interstage	+23	20,000 30,000	.5 .5	800 1,200	450	32
SO-8	Transistor to PP Sec.	+23	10,000	1	2,000 ct.	1,000	40
SO-9	PP Transistor to V.C.	+24	500 ct.	0	3.2	15	.35

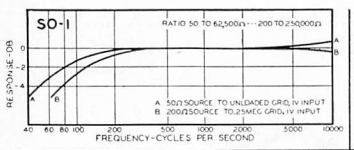
*Impedance ratio is fixed, 1250:1 for SO-1, 1:50 for SO-3. Any impedance between the values shown may be employed.

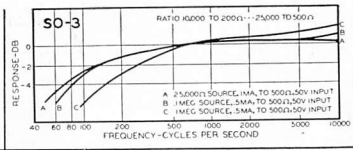


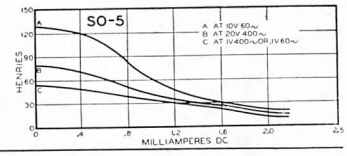
SUBOUNCER UNIT

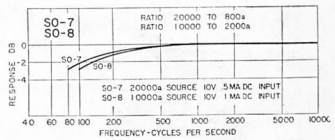
Dimensions.....1 3/32" x 4 3/64" x 7/8"

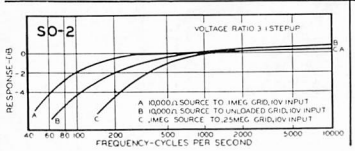
Weight .....03 lb.

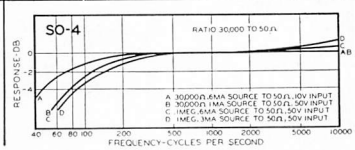

SO-1
RATIO 50 TO 62,500Ω ··· 200 TO 250,000Ω
A 50Ω SOURCE TO UNLOADED GRID, IV INPUT
B 200Ω SOURCE TO 25 MEG GRID, IV INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND

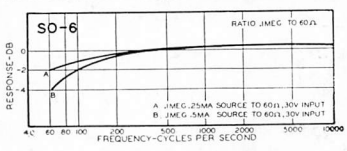

SO-3
RATIO 10,000 TO 200Ω ··· 25,000 TO 500Ω
A 25,000Ω SOURCE, 1MA, TO 500Ω, 50V INPUT
B 1 MEG SOURCE, 5MA, TO 500Ω, 50V INPUT
C 1 MEG SOURCE, 5MA, TO 500Ω, 50V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND

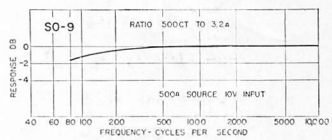





SO-2
VOLTAGE RATIO 3:1 STEPUP
A 10,000Ω SOURCE TO 1MEG GRID, 10V INPUT
B 10,000Ω SOURCE TO UNLOADED GRID, 10V INPUT
C 1MEG SOURCE TO 25MEG GRID, 10V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND


SO-4
RATIO 30,000 TO 50Ω
A 30,000Ω, 6MA SOURCE TO 50Ω, 10V INPUT
B 30,000Ω, 1MA SOURCE TO 50Ω, 50V INPUT
C 1MEG, 6MA SOURCE TO 50Ω, 50V INPUT
D 1MEG, 3MA SOURCE TO 50Ω, 50V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND


SO-6
RATIO 1MEG TO 60Ω
A 1MEG, 25MA SOURCE TO 60Ω, 30V INPUT
B 1MEG, 5MA SOURCE TO 60Ω, 30V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND

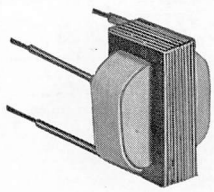


SUB-SUBOUNCER UNITS

UTC Sub-SubOuncer units have exceptionally high efficiency and frequency range in their ultra-miniature size. This has been effected through the use of specially selected Hiperm-Alloy core material and special winding methods. The constructional details are identical to those of the Sub-Ouncer units.

Type	Application	Max. Level dbm	Pri. Imp. ohms	MA D.C. in Pri.	Sec. Imp. ohms	Pri. Res. ohms	Sec. Res. ohms
*SSO-1	Input	+ 7	200 50	0	250.000 62,500	13.5	3600
SSO-2	Interstage/3:1	+15	10,000	0-.25	90,000	710	3150
*SSO-3	Plate to Line	+20	10,000 25,000	3 1.5	200 500	2500	34
SSO-4	Output	+20	30,000	1.0	50	2875	4.6
SSO-5	Reactor 50 HY at 1 mil. D.C. 4400 ohms D.C. Res.						
SSO-6	Output	+20	100,000	.5	60	3500	3.3
*SSO-7	Transistor Interstage	+20	20,000 30.000	.5 .5	800 1.200	800	110
SSO-8	Transistor to PP Sec.	+20	10,000	1	2,000 ct.	1200	45
SSO-9	Transistor to V.C.	+20	10,000	2	16	800	2.7
SSO-10	Transistor to V.C.	+20	10,000	2	3.2	800	.65
SSO-11	Transistor Output	+20	500 600	3.5 3.5	50 60	50	5
SSO-12	Transistor Output	+20	1,000 1 200	3 3	50 60	90	5
SSO-13	Crystal to Transistor	+ 7	200.000	0	1.000	4000	190

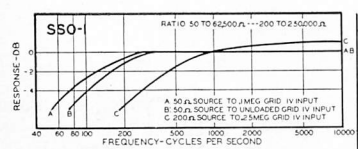
* Impedance ratio is fixed, 1250:1 for SSO-1, 1:50 for SSO-3. Any impedance between the values shown may be employed.

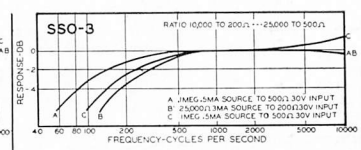


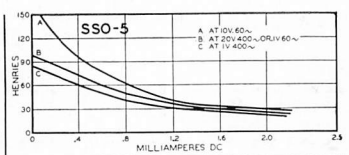
SUB-SUBOUNCER UNIT

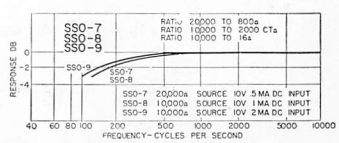
Dimensions.....7/16" x 3/4" x 4 3/64"

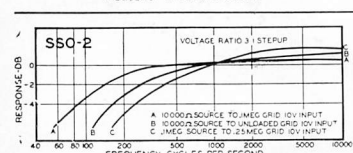
Weight .....02 lb.

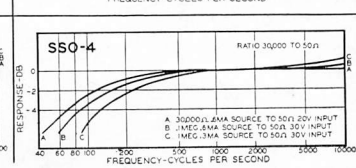

SSO-1
RATIO 50 TO 62,500Ω ··· 200 TO 250,000Ω
A 50Ω SOURCE TO 1MEG GRID IV INPUT
B 50Ω SOURCE TO UNLOADED GRID IV INPUT
C 200Ω SOURCE TO 2.5MEG GRID IV INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND

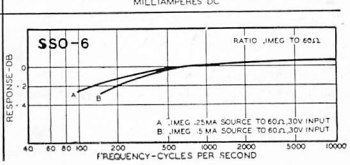

SSO-3
RATIO 10,000 TO 200Ω ··· 25,000 TO 500Ω
A 1MEG, 5MA SOURCE, TO 500Ω, 30V INPUT
B 25,000Ω, 1MA SOURCE TO 200Ω, 30V INPUT
C 1MEG, 5MA SOURCE TO 500Ω, 30V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND

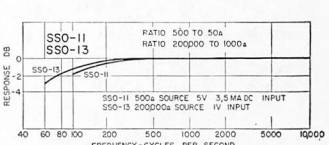



SSO-7
SSO-8
SSO-9
RATIO 20000 TO 800Ω
RATIO 10000 TO 2000 CTa
RATIO 10000 TO 16Ω
SSO-7 20,000Ω SOURCE 10V .5MA DC INPUT
SSO-8 10,000Ω SOURCE 10V 1 MA DC INPUT
SSO-9 10,000Ω SOURCE 10V 2 MA DC INPUT
RESPONSE DB
FREQUENCY-CYCLES PER SECOND


SSO-2
VOLTAGE RATIO 3:1 STEPUP
A 10,000Ω SOURCE TO 1MEG GRID 10V INPUT
B 10,000Ω SOURCE TO UNLOADED GRID 10V INPUT
C 1MEG SOURCE TO 2.5MEG GRID 10V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND


SSO-4
RATIO 30,000 TO 50Ω
A 30,000Ω, 6MA SOURCE TO 50Ω, 20V INPUT
B 1MEG, 6MA SOURCE TO 50Ω, 30V INPUT
C 1MEG, 3MA SOURCE TO 50Ω, 30V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND


SSO-6
RATIO 1MEG TO 60Ω
A 1MEG, 25MA SOURCE TO 60Ω, 30V INPUT
B 1MEG, 5MA SOURCE TO 60Ω, 30V INPUT
RESPONSE-DB
FREQUENCY-CYCLES PER SECOND



UTC LEADERSHIP IN HIGH FIDELITY

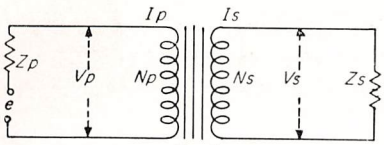


Fig 1

ELECTRICAL CIRCUIT OF AN IDEAL TRANSFORMER WITH 100 PERCENT EFFICIENCY

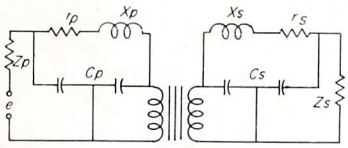


Fig 2

ILLUSTRATING A PHYSICAL TRANSFORMER

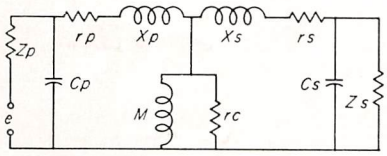


Fig 3

EQUIVALANT T NETWORK OF THE SAME TRANSFORMER IN FIG 2

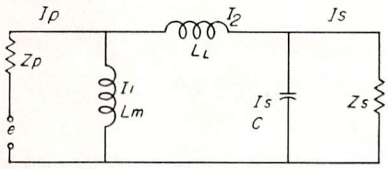


Fig 4

A SIMPLIFICATION OF THE EQUIVALENT TRANSFORMER CIRCUIT SHOWN IN FIG 3

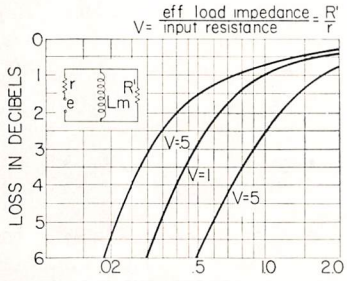


FIG 5 CURVES SHOWING THE LOSS DUE TO SHUNTING EFFECT OF THE PRIMARY OF A TRANSFORMER

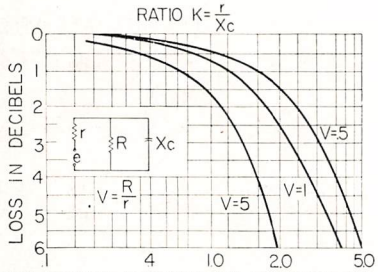


FIG 6 CURVES SHOWING THE LOSS DUE TO DISTRIBUTED CAPACITY IN AN AUDIO FREQUENCY CIRCUIT

FACTORS CONTROLLING FREQUENCY RESPONSE

The figures at the left indicate the basic story with reference to high fidelity audio transformers. Figure 1 represents an ideal transformer having 100% efficiency. Figure 2 shows the equivalent of a practical transformer with its varied reactances and capacities. Figure 3 is an equivalent "T" network of the same transformer, which can be further simplified to the basic elements illustrated in Figure 4. It is apparent from Figure 4 that L_m (primary inductance) represents a reactance which drops with frequency and, as a consequence, controls the low frequency response. L_L (the leakage reactance) and C (the distributed capacity) similarly control the high frequency response. Figures 5 and 6 respectively show the frequency attenuation curves for given primary inductance and distributed capacity.

UTC FREQUENCY RESPONSE

It is obvious from the above that high primary inductance will provide good low frequency response. For a particular core structure this necessitates the use of a large number of turns in the transformer windings. Unfortunately, as the turns are increased, both leakage reactance and distributed capacitance increase, with a corresponding loss in the higher frequencies. This effect is minimized in UTC transformers by employing transformer core material of exceptional permeability, so that a minimum number of turns are required. In low level transformers we employ Hipermalloy, which is a stable nickel iron alloy selected for maximum characteristics. In high level transformers oriented grain silicon steels provide maximum permeability and minimum distortion. Uniquely low distributed capacity and leakage reactance are obtained through special winding methods. Output transformers will have as many as 16 interleaved windings to provide extremely low leakage reactance. Input transformers employ sectional windings to effect very low distributed capacity.

WAVE FORM DISTORTION

Low wave form distortion requires great care in both design and manufacture. UTC high fidelity products provide a minimum of such distortion through the use of conservative flux densities, symmetrical coupling in pushpull windings, low leakage reactance, and negligible resonance in coil structures. For example, low distortion in high level transformer designs, necessitates excellent response down to 7 cycles to assure negligible distortion at 20 to 30 cycles. For low distortion at high frequencies, in addition to primary and secondary windings being interleaved, excellent coupling is provided between primary halves. As an example, the LS-692 modulation transformer employs 10 sections in each primary half . . . with these sections individually cross-interleaved.

SHIELDING

Inductive pickup in low level transformers is a basic circuit problem. The balanced coil structure, a development of the UTC engineering staff, is employed in the bulk of UTC low level transformers to provide very low pickup. This structure employs two accurately balanced astatic coils . . . virtually neutralizing stray pickup. In addition, the UTC high fidelity lines are housed in heavy high conductivity die castings, plus additional multiple alloy shields for many of the designs. While it is customary to make such shields of 47% nickel alloy, all UTC shields are 78% nickel to provide the greatest hum attenuation possible.

FLEXIBILITY

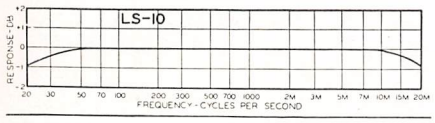
The multi-tapped winding, a development of the UTC engineering staff, provides a wide range of impedances in high fidelity transformers with excellent coupling and balance. High efficiency and full response are obtained at any of the impedances specified.

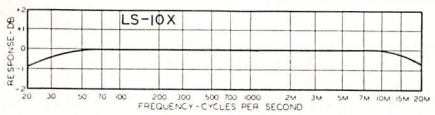
RELIABILITY

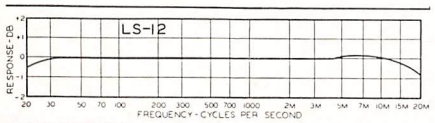
The designs of UTC high fidelity transformers are inherently centered around ruggedness and reliability. In addition, however, UTC quality control, which is accepted as the highest in the industry, assures the fulfillment of these design requirements in the ultimate manufactured product. The recognition of the dependability of UTC units is illustrated by their usage in the finest broadcast equipment, produced by such organizations as RCA, General Electric, etc.

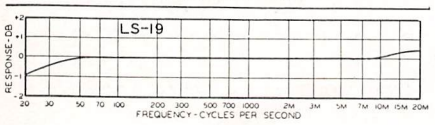
LINEAR STANDARD AUDIO TRANSFORMERS

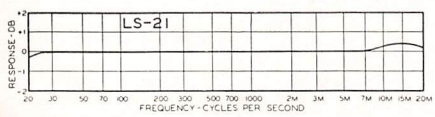
The ever increasing use of wide range equipment for broadcast service has reached the point where the major limiting factor is the frequency range of the transformers employed. UTC Linear Standard components represent the closest approach to the ideal transformer from the standpoint of uniform frequency response, low wave form distortion, high efficiency, thorough shielding, and dependability.

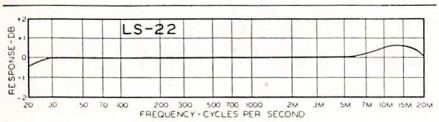


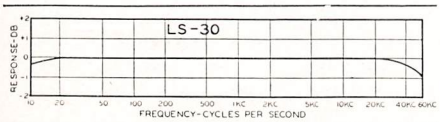


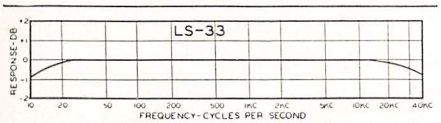


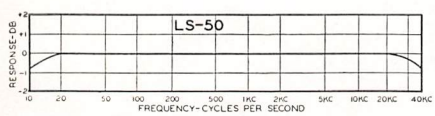


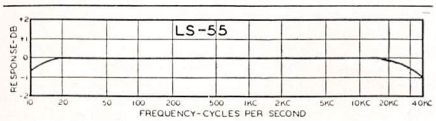


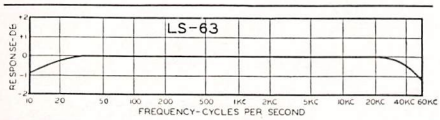


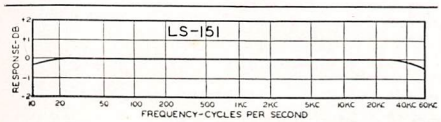












LINEAR STANDARD AUDIO UNITS FEATURE:

UNIFORM FREQUENCY RESPONSE . . . at low frequencies, is effected through the use of HIPERM-ALLOY, a STABLE nickel iron alloy of very high initial permeability. Uniform high frequency response is the result of multiple section interleaved windings arranged in a semi-toroidal coil structure. This, plus special winding methods and insulations, assures a minimum of distributed capacity and leakage reactance.

UTC LINEAR STANDARD transformers are the ONLY audio units with a **GUARANTEED** response . . . **± 1 DB from 20 to 20,000 cycles.**

For low distortion, high level units far exceed this . . . ± 1 DB from 7 to 50,000 cycles.

MINIMUM HUM PICKUP . . . is accomplished through the use of a hum balanced, semi-toroidal, coil structure which affords maximum neutralization of external fields. In addition, all units employ high conductivity outer case for maximum shielding. For very low level applications, units whose code numbers end in X employ multiple alloy shielding, making possible a transformer with extremely low inductive pickup.

DEPENDABILITY . . . is a function of external and internal structure. Linear Standard units are housed in rugged die cast cases of precise dimension with reversible mounting to permit above chassis or subchassis wiring. The solid terminal posts on low absorption bakelite are arranged in a circular layout so that a round chassis hole will clear all terminals. Coils are vacuum baked and impregnated. **Semi-hermetic sealing** is accomplished through the use of a high adhesion compound poured through the large opening opposite the terminal board after controlled preheating of the unit for full compound penetration.

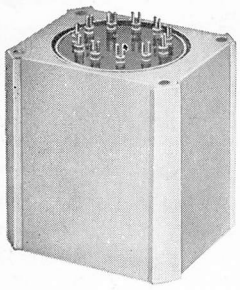
LOW IMPEDANCE TO GRID TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-10	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200, 250, 333, 500/600 ohms	60,000 ohms in two sections	20-20,000	+19	−74 DB	.5 MA	LS-1
LS-10X	As above	As above	50,000 ohms	20-20,000	+17	−92 DB-Q	.5 MA	LS-1
LS-12	Low impedance mike, pickup or multiple line to push pull grids	50, 125/150, 200, 250, 333, 500/600 ohms	120,000 ohms overall, in two sections	20-20,000	+19	−74 DB	.5 MA	LS-1
LS-12X	As above	As above	80,000 ohms overall, split	20-20,000	+17	−92 DB-Q	.5 MA	LS-1
LS-14	Low impedance mike, pickup, or parallel mixer to grid	2.5, 5.5, 10, 15, 22, 30, 38, 60 ohms	60,000 ohms in two sections	20-20,000	+19	−74 DB	.5 MA	LS-1
LS-14X	As above	As above	50,000 ohms	20-20,000	+17	−92 DB-Q	.5 MA	LS-1
LS-15X	Three isolated lines or pads to one or two grids	30, 50, 200, 250 ohms each primary	60,000 ohms overall, in two sections	20-20,000	+17	−92 DB-Q	.5 MA	LS-1
LS-18	High level multiple line to push pull grids	50, 125/150, 200, 250, 333, 500/600 ohms	50,000 ohms overall, in two sections	20-20,000	+28	−50 DB	.5 MA	LS-2
LS-26	Bridging line to single or push pull grids	5,000 ohms	60,000 ohms in two sections	15-20,000	+23	−74 DB	0 MA	LS-1

MIXING TRANSFORMERS

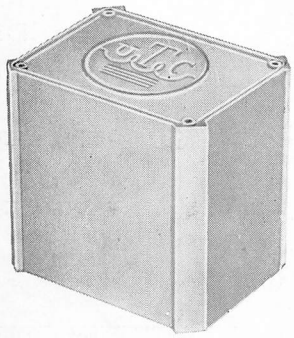
Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-30	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125/150, 200, 250, 333, 500/600 ohms	50, 125/150, 200, 250, 333, 500/600 ohms	7-50,000	+23	−74 DB	.5 MA	LS-1
LS-30X	As above	As above	As above	20-20,000	+20	−92 DB-Q	.3 MA	LS-1
LS-31	Three isolated lines or pads to multiple line	30, 50, 200, 250 ohms each primary	50, 125/150, 200, 250, 333, 500/600 ohms	20-20,000	+23	−74 DB	.5 MA	LS-1
LS-31X	As above	As above	As above	20-20,000	+20	−92 DB-Q	.3 MA	LS-1
LS-32	Mixing, low impedance mike, pickup or parallel mixer to multiple line	2.5, 5.5, 10, 15, 22, 30, 38, 60 ohms	50, 125/150, 200, 250, 333, 500/600 ohms	20-20,000	+23	−74 DB	.5 MA	LS-1

The values of unbalanced DC shown will effect approximately 1.5 DB loss at 30 cycles.
* Comparison of hum balanced unit with shielding to normal uncased type.
Q Multiple alloy magnetic shield.



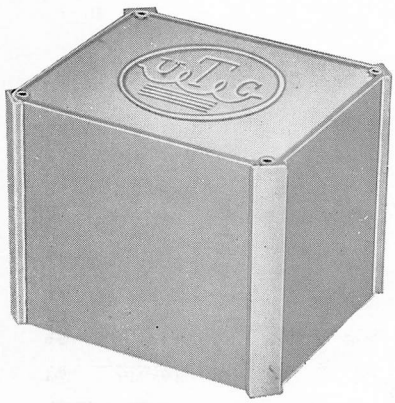
LS-1 CASE

Length ..... 3⅛"
Width ..... 2⅝"
Height ..... 3¼"
Mounting ..... 1 15/16" x 2 7/16"
Screws 6-32
Cutout ..... 1⅞" dia.
Unit Weight ..... 3 lbs.



LS-2 CASE

Length ..... 4 7/16"
Width ..... 3½"
Height ..... 4 3/16"
Mounting ..... 2 11/16" x 3 11/16"
Screws 8-32
Cutout ..... 2¾" dia.
Unit Weight ..... 7.5 lbs.



LS-3 CASE

Length ..... 5 13/16"
Width ..... 5"
Height ..... 4 11/16"
Mounting ..... 4 3/16" x 5 1/32"
Screws 10-24
Cutout ..... 3¾" dia.
Unit Weight ..... 15 lbs.

INTERSTAGE AUDIO TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-19	Single plate to push pull grids like 2A3, 6L6, 5881 Split secondary	15,000 ohms	95,000 ohms 1.25:1 each side	20-20,000	+20	−50 DB	0 MA	LS-1
LS-21	Single plate to push pull grids. Split pri. and sec.	15,000 ohms	135,000 ohms; 3:1 overall	10-20,000	+20	−74 DB	0 MA	LS-1
LS-40	Single plate to push pull grids. Split secondary	15,000 ohms	135,000 ohms; 3:1 overall	30-20,000	+20	−74 DB	8 MA	LS-1
LS-22	Push pull plates to push pull grids. Split primary and secondary	30,000 ohms plate to plate	80,000 ohms; turn ratio 1.6:1 overall	20-20,000	+28	−50 DB	.25 MA	LS-2
LS-25	Push pull plates to push pull grids. Medium level. Split primary and sec.	30,000 ohms plate to plate	50,000 ohms; turn ratio 1.3:1 overall	20-20,000	+23	−74 DB	1 MA	LS-1

PLATE, CRYSTAL, PHOTOCELL, AND BRIDGING TO LINE TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-27	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-15,000 cycles	+23	−74 DB	8 MA	LS-1
LS-50	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	10-40,000	+23	−74 DB	0 MA	LS-1
LS-51	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	10-40,000	+24	−74 DB	1 MA	LS-1
LS-150	Bridging from 50 to 500 ohm line to line	4,000 ohms, bridging	50, 125/150, 200, 250, 333, 500/600	7-50,000	+23	−74 DB	1 MA	LS-1
LS-151	Bridging from 50 to 500 ohm line to line	16,000 ohms, bridging	50, 125/150, 200, 250, 333, 500/600	7-50,000	+26	−74 DB	1 MA	LS-1

HYBRID AND REPEAT COILS

Type No.	Application	Pri. and Sec. Impedances	± 1 db from	Max. Level dbm	Relative * hum	Max. Unbal. DC in Pri.	Case No.
LS-140	Line to line for isolating balanced and unbalanced circuits; balanced for maximum reduction cross talk (70 DB)	500/600 ohms split 500/600 ohms split	30-20,000	+18	−92 DB-Q	0 MA	LS-1
LS-141	Three sets of balanced windings for hybrid service, centertapped	500/600 ohms 500/600 ohms	30-15,000	+18	−74 DB	0 MA	LS-1
LS-143	High efficiency ring and talk repeat coil, for low frequency ringing	500/600 ohms 500/600 ohms	Efficient 15/12,000 cycles	+33	−74 DB	5 MA	LS-2

DRIVER TRANSFORMERS

Type No.	Application	Primary Impedance	Refl. Sec. Impedance	± 1 db from	Max. Level	Max. Unbal. DC in Pri.	Case No.
LS-6	Driver, push pull 2A3's, etc., to push pull 845 or 211D grids	5,000 ohms plate to plate	2:25 primary impedance; turns ratio 1.5:1 overall	20-20,000	15 watts	5 MA	LS-2
LS-47	Driver from push pull 2A3's, or similar to class B 838's, 805's, or ZB120's	5,000 ohms plate to plate	.1 pri. impedance turns ratio, Pri./½ Sec. 3.2:1	20-20,000	20 watts	5 MA	LS-2
LS-48	Driver transformer push pull 845's to 805 grids in class B	12,000 ohms plate to plate	.038 pri. impedance turns ratio, Pri./½ Sec. 5.1:1	20-20,000	40 watts	15 MA	LS-3

HIGH LEVEL MATCHING TRANSFORMERS

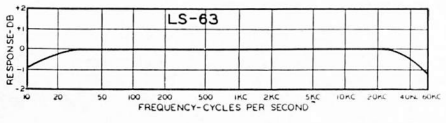
Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-33	High level line matching	50, 125, 200, 250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5 10, 15, 20, 30, 50 125, 200, 250, 333, 500/600	10-40,000	20 watts	LS-2
LS-34	High level line matching	50, 125, 200, 250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5 10, 15, 20, 30, 50, 125, 200, 250, 333, 500/600	10-40,000	40 watts	LS-3

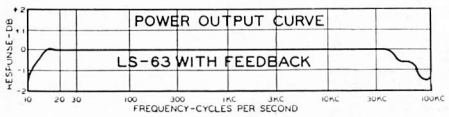
The values of unbalanced DC shown will effect approximately 1.5 DB loss at 30 cycles.
* Comparison of hum balanced unit with shielding to normal uncased type.
Q Multiple alloy magnetic shield.

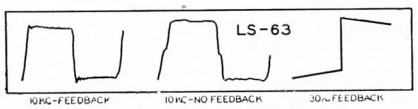
LS OUTPUT TRANSFORMERS . . . THE FINEST

While the UTC Linear Standard line is generally designed for a flat response from 20 cycles to 20 Kc., a much wider response is required for output transformers. A transformer that would be down 1 DB at 20 cycles and 20 Kc. would have substantial distortion components at 30 cycles and 10 Kc. As is noted in the left curve below, typical UTC output transformers are down less than 1 DB at 10 cycles and less than 1 DB at 50 Kc. Because of this, a fine power output curve is possible. The center curve below indicates the power output response curve of a "Williamson" Amplifier employing the LS-63. The third figure below illustrates square waves obtained with the LS-63 transformer. Of particular interest is the short rise time, which is far superior for UTC transformers than any standard make which we have measured. The excellent high frequency response is evident both with and without feedback. At the low frequency end the high inductance of these transformers is illustrated by the small angle at the top of the 30 cycle square wave.

The above characteristics are obtained only by maintaining high primary inductance and low leakage reactances. For the LS-63 the primary inductance is 300 Hys. at 50 volts, 60 cycles. The leakage reactance of each half primary to the secondary is approximately 11 Mhy., and the leakage reactance of each half primary to the other half primary is approximately 20 Mhy.







OUTPUT TRANSFORMERS TO LINE AND VOICE COIL

Type No.	Primary will match following typical tubes	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-52	Push pull 6AQ5, 6V6, 6L6, 5881	8,000 ohms	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-54	Same as above	8,000 ohms	30, 20, 15, 10 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-55	Push pull 2A3's, 300B, 6L6's, 6AS7G, 6080, 350B	5,000 ohms plate to plate and 3,000 ohms plate to plate	500, 333, 250 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-57	Same as above	5,000 ohms plate to plate and 3,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-58	Push pull parallel as above.	2,500 ohms plate to plate and 1,500 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000	40 watts	LS-3
LS-60A	Push pull 2A3's, push pull parallel triode: 1614, 1625, 807, 5881, KT-66	4,600 ohms plate to plate	15, 10, 7.5, 5, 3.75, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-61	Push pull triode: 6AS7G, 6080, 6L6, 5881, KT-66, 807, 1614	10,000 ohms plate to plate and 6,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-63	Same as above	10,000 ohms plate to plate and 6,000 ohms plate to plate	30, 20, 15, 10 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-6L1	Self bias push pull 6L6's, 5881, KT-66, 6146 triode, 6159 triode	9,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-6L3	Same as above	9,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-6L4	Push pull 6146, 6159, 6L6's fixed bias or push pull parallel 6L6's self bias	4,500 ohms plate to plate and 3,800 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	12-50,000	55 watts	LS-3

LS-6 CASE

Length ..... 15¾"
Width ..... 13"
Height . . . LS-691 ..... 24"
Height . . . LS-692 ..... 28"
Mounting Dimension ... 7⅜" x 14 15/16"
Mounting Hole ..... ⅜" dia
Unit Weight ..... 350 lbs.
Unit Weight . . . LS-691 ..... 370 lbs.
Unit Weight . . . LS-692 ..... 520 lbs.

MODULATION TRANSFORMERS

(No DC in Secondary)

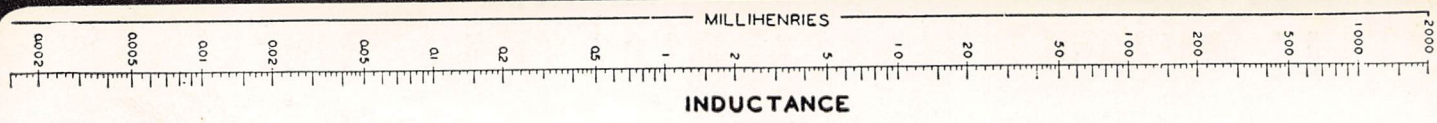
Type No.	Primary will match following typical tubes	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-56	Push pull 2A3's, 6A5G's, 300B's, 6AS7G, 6L6, 6080	5,000 ohms plate to plate and 3,000 ohms plate to plate	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000	20 watts	LS-2
LS-66	Class B 838, ZB120, 805	9,000 ohms plate to plate	5000, 4200, 4100, 3500, 3300, 2650, 2500, 2100, 1250, 600	10-50,000	260 watts	*
LS-691	Class B, 833A, 250TH	10,400 ohms plate to plate	4500, 4000, 3500, 2750, 2000	20-40,000	1000 watts	LS-6
LS-692	Class B push pull parallel 833A's	4,750 ohms plate to plate	2500, 2000, 1750, 1500, 1250	20-40,000	2500 watts	LS-6

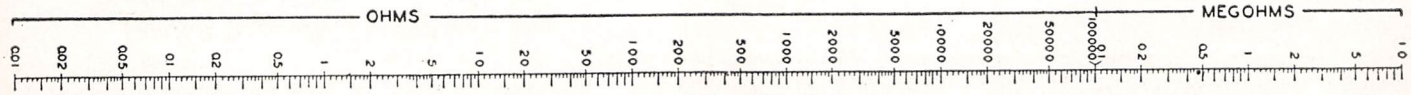
DIMENSIONS

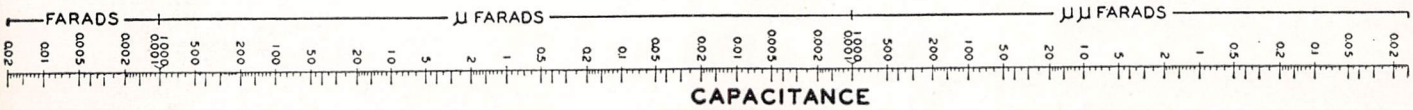
Type No.	L	W	H	Mtg.	Wt.
LS-66	9¾	4¾	6¾	3⅞ x 9⅛	37
LS-102	9¾	4¾	6¾	3⅞ x 9⅛	37
LS-103	13⅛	8½	10¼	7¼ x 12⅛	58
LS-106	17¼	10	13¼	8½ x 16½	158

MODULATION REACTORS

Type No.	Application	Inductance	DC Current	DC Resistance	Insulation Test Voltage
LS-102	Modulation reactor	50 hy	350 MA	250 ohms	5000
LS-103	Modulation reactor	50 hy	500 MA	175 ohms	7500
LS-106	Modulation reactor	50 hy	750 MA	120 ohms	10000

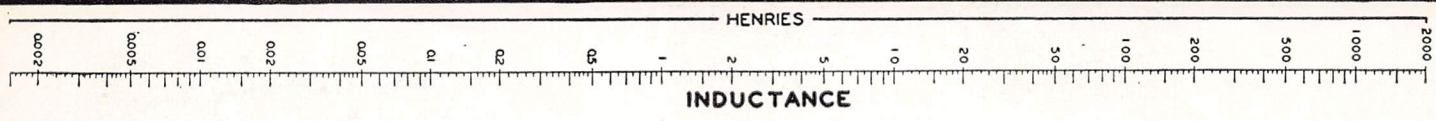


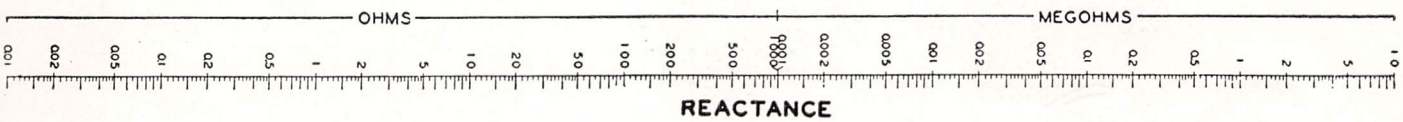


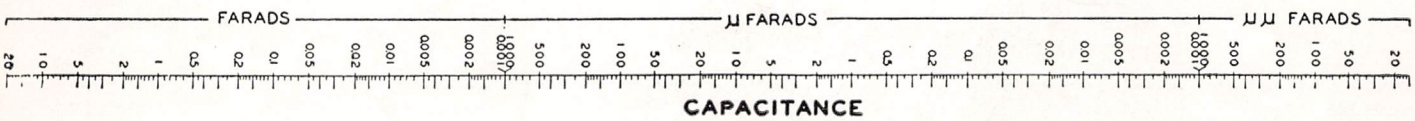


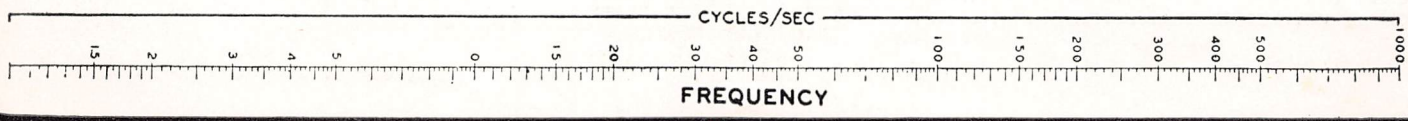
REACTANCE—FREQUENCY CHART

A straight edge across known values in any two columns will locate the corresponding values in the other two columns. For example, take an inductance of 1 Henry at 50 cycles. A straight edge across these points will intersect the reactance line at 310 ohms, and the capacity line at 10 mfd. indicating the capacity required for resonance.









REVOLUTIONARY LINEAR STANDARD AMPLIFIER

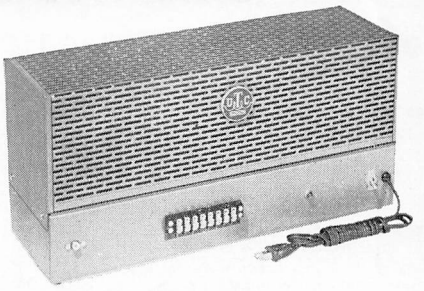
NEW HEIGHT OF FIDELITY
20 WATTS . . . KIT FORM

The Linear Standard amplifier climaxes a project assigned to our audio engineering group a year ago. The problem was, why does a Williamson circuit amplifier which tests beautifully in the laboratory seem to have considerable distortion in actual use? It took a year to fully determine the nature and cause of these distortions and the positive corrective measures. This new amplifier not only provides for full frequency response over the audio range but, in addition, sets a new standard for minimum transient dirtortion.

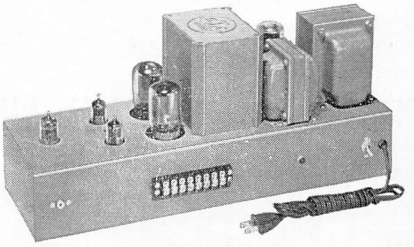
An inherent weakness of the Williamson circuit lies in the fact that its negative feedback becomes positive at subsonic and supersonic frequencies. The resultant instability in use lends to parasitic oscillation at the high end and large subaudio cone excursions both of which produce substantial distortions. The Linear Standard Amplifier uses Multiple Loop Feedback and network stabilization to completely eliminate these instabilities. The oscillagrams below show comparative performance. The flat frequency response and extremely low intermodulation distortion provided by 36 db feedback, are self evident from the curves shown.

In addition to providing an ideal amplifier electrically, considerable thought was given to its physical form. A number of points were considered extremely important: (1) Size should be minimum (power and audio on one chassis). (2) Each kit must have identical characteristics to lab model. (3) Rugged, reliable, structure is essential.

This resulted in a rather unique construction employing a printed circuit panel as large as the chassis with virtually all components pre-assembled and wired. The result is that each kit, which comes complete, including tubes and cover, can be fully pretested before shipment. Additional wiring involves only the connection of 17 leads to screw terminals for completion.

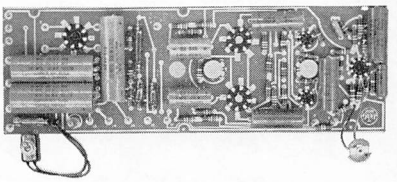


LINEAR STANDARD MLF AMPLIFIER



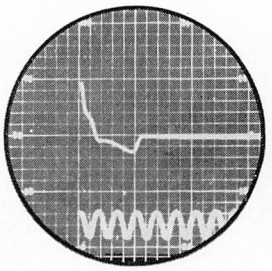
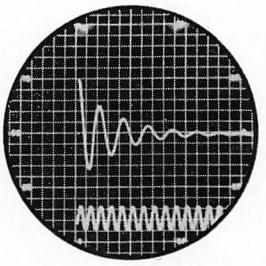
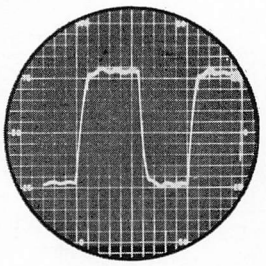
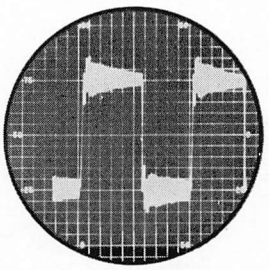
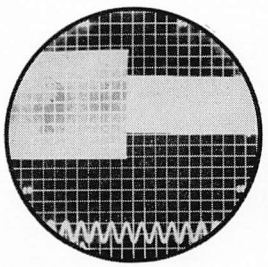
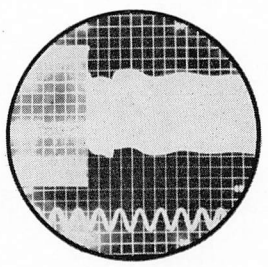
WITH COVER REMOVED

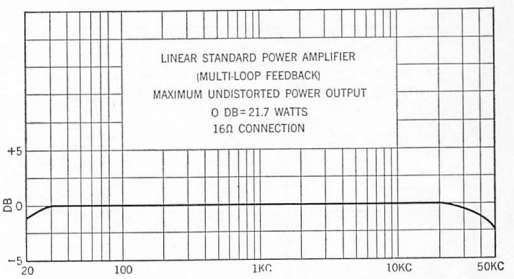
SUITED TO 7" RACK PANEL MOUNTING



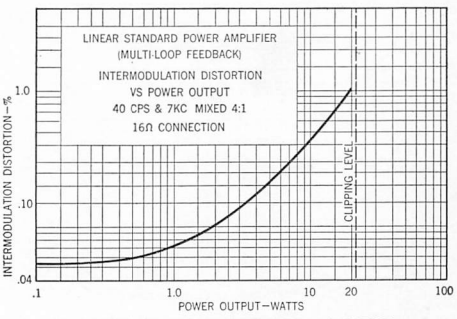
PRINTED CIRCUIT CONSTRUCTION

COMPARATIVE PERFORMANCE

	LINEAR STANDARD	WILLIAMSON
Step function (low frequency) transient stability.		
High frequency oscillation stability. Average speaker wiring capacity.		
Overload recovery transients.		



FREQUENCY RESPONSE CURVE



INTERMODULATION DISTORTION CURVE

LINEAR STANDARD TYPE MLF AMPLIFIER SPECIFICATIONS . . .

Rated Power Output:	20 Watts
Intermodulation Distortion:	.07%-1W, 1%-20W
Frequency Response (controlled):	1 db 20 to 20,000 cycles
Hum & Noise Level:	80 db below rated output
Feedback:	36 db
Output impedances (not critical):	4, 8, 16 . . . also 2, .5, 10, 20, 30 ohms
Tubes:	1-12AX7, 2-6AU6, 2-5881, 1-5V4G
Dimensions & Weight:	5¼" x 8" x 17⅛", 24 lbs.

UTC HIPERMALLOY TRANSFORMERS

LOW IMPEDANCE TO GRID AND MIXING TRANSFORMERS

Type No.	Application	Primary Imp. (ohms)	Secondary Impedance	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-100	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200, 250, 333, 500/600	60,000 ohms in two sections	30-20,000	+18	.5 MA	H-1
HA-100X	Same as above but with multiple alloy shield to effect very low hum pickup				+16		H-1
HA-101	Low impedance mike, pickup, or multiple line to P.P. grids	50, 125/150, 200, 250, 333, 500/600	120,000 ohms overall, split	30-20,000	+18	.5 MA	H-1
HA-101X	As above but with multiple alloy shield to effect very low hum pickup		80,000 ohms overall, split	30-20,000	+16	.5 MA	H-1
HA-103A	Low impedance mike, pickup, or parallel mixer to grid	2.5, 5.5, 10, 15, 22, 30, 38, 60	60,000 ohms in two sections	30-20,000	+18	.5 MA	H-1
HA-108	Mixing, low impedance mike, pickup, or multiple line	50, 125/150, 200, 250, 333, 500/600	50, 125/150, 200, 250, 333, 500/600	20-50,000	+20	.5 MA	H-1
HA-108X	Same as above but with multiple alloy shield to effect very low hum pickup				+18		H-1
HA-130X	Three isolated lines or pads to one or two grids with tri-alloy internal shield	30, 50, 200, 250 each primary	60,000 ohms overall, in two sections	30-20,000	+18	.5 MA	H-1

INTERSTAGE AUDIO TRANSFORMERS

Type No.	Application	Primary Imp.	Secondary Impedance	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-104	Single plate to P.P. grids like 2A3, 6L6 (split secondary)	15,000 ohms	95,000 ohms 2.5:1	30-20,000	+20	0 MA	H-1
HA-105	Single plate to single grid (split secondary)	15,000 ohms	60,000 ohms 2:1 turn ratio	30-20,000	+20	0	H-1
HA-106	Single plate to push pull grids (split secondary)	15,000 ohms	135,000 ohms 3:1 ratio overall	30-20,000	+20	0	H-1
HA-107	Push pull plates to push pull grids (split primary and secondary)	30,000 ohms plate to plate	80,000 ohms 1.6:1 turn ratio overall	30-20,000	+28	.25 MA	H-2
HA-137	Push pull plates to push pull grids (split Pri. and Sec.)	30,000 ohms plate to plate	68,000 ohms 1.5:1 turn ratio	30-20,000	+20	0	H-1

PLATE AND CRYSTAL TO LINE TRANSFORMERS

Type No.	Application	Primary Imp.	Secondary Imp. ohms	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-111	Crystal microphone or pickup, to multiple line	100,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-20,000 measured with resistive source	+18	0	H-1
HA-113	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-40,000	+21	0 MA	H-1
HA-133	Single plate to multiple line (D.C. in Pri.)	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-40,000	+22	8 MA	H-1
HA-114	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	30-40,000	+23	1 MA	H-1

OUTPUT TRANSFORMERS

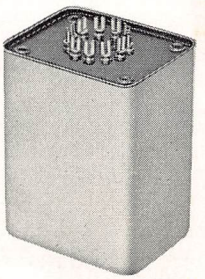
Type No.	Application	Primary Imp.	Secondary Imp. ohms	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-134	Push pull, 6L6, or 2A3's to line	5000/9400 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	10-50,000	15 watts	5 MA	H-2
HA-135	Push pull 2A3's, etc. to voice coil	3000/5000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000	18 watts	5 MA	H-2

POWER TRANSFORMERS AND CHOKES

Type No.	Application	Primary Voltage 50/60 cycles	High Voltage	Filament Windings	Case No.
HP-122	Pre-amp. power supply using 6X4, 6X5GT rectifier	115	220-0-220 15 MA	6.3 V.C.T.-.6A 6.3 V.C.T.-1.2A	H-1
HP-123	Pre-amp. or tuner power supply using 6X4, 6X5GT rectifier	115	275-0-275 35 MA	6.3 V.C.T.-.6A 6.3 V.C.T.-2A	H-2

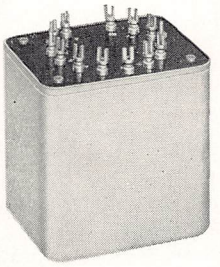
Type No.	Application	Inductance	DC Current	DC Resistance	Test Voltage	Case No.
HC-115	Parallel feed and filter choke	Series-400 hy Parallel-100 hy	2.5 MA 5 MA	6000 ohms 1500 ohms	1500	H-1
HC-116	Parallel feed and filter choke	Series-600 hy Parallel-150 hy	8 MA 16 MA	3400 ohms 850 ohms	1500	H-2
HC-117	Parallel feed and filter choke	Series-200 hy Parallel-40 hy	15 MA 35 MA	3200 ohms 800 ohms	1500	H-1

The UTC Hipermalloy audio and power transformers are specifically designed for portable and compact service. While light in weight, neither dependability nor fidelity has been sacrificed. The frequency characteristic of the Hipermalloy audio units is uniform from 30 to 20,000 cycles. They incorporate a Hipermalloy nickel iron core and hum balanced coil structure. The rugged die cast case is of high conductivity alloy finished in grey, arranged for mounting with the terminals either up or down. DC in Primary shown is maximum unbalanced.



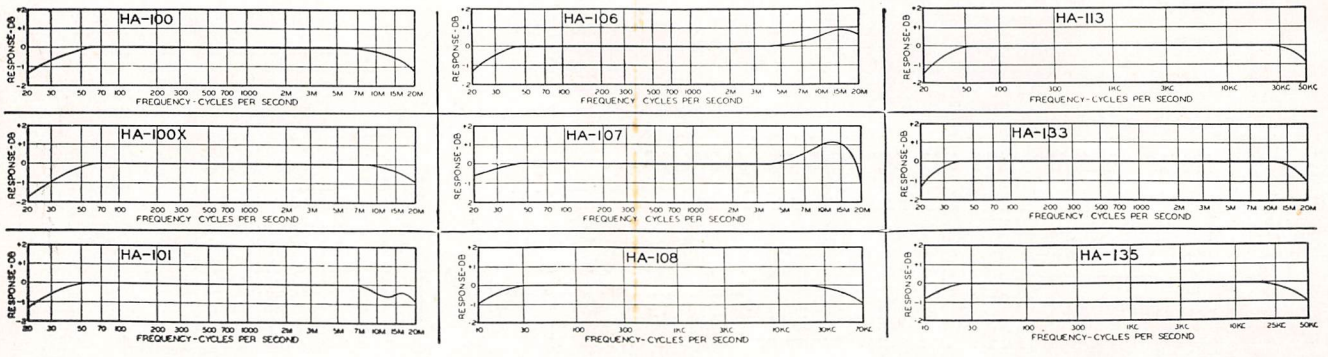
TYPE H-1 CASE

Length	2⅜"
Width	1 15/16"
Height	3⅛"
Mounting	1⅜" x 1 3/16"
Screws	6-32
Cutout	1 3/16" dia.
Unit Weight	2 lbs.



TYPE H-2 CASE

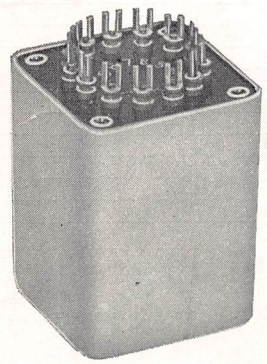
Length	3 9/16"
Width	2 3/16"
Height	3½"
Mounting	2" x 2¾"
Screws	6-32
Cutout	2 1/16" dia.
Unit Weight	5 lbs.



ULTRA COMPACT AUDIO UNITS

The **UTC Ultra compact** audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. High fidelity is obtainable in all individual units, the frequency response being ± 2 DB from 30 to 20,000 cycles.

All units except those carrying DC in Primary employ a true hum balancing coil structure, which combined with a high conductivity outer case, effects good inductive shielding. The die-cast case provides for top or bottom mounting. Maximum operating level + 15 dbm.



TYPE A CASE

Length	1½"
Width	1½"
Height	2"
Mounting	1 5/32" sq.
Screws	4-40
Cutout	1⅜" dia.
Unit Weight	½ lb.

LOW IMPEDANCE TO GRID AND MIXING TRANSFORMERS

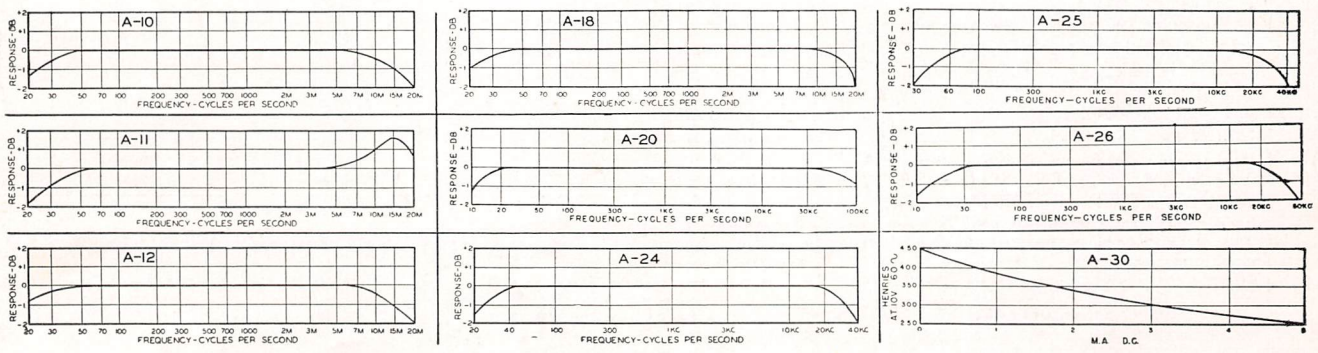
Type No.	Application	Primary Impedance	Secondary Impedance	± 2 db from
A-10	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200/250, 333, 500/600 ohms	50,000 ohms	20-20,000
A-11	Low impedance mike, pickup, or line to 1 or 2 grids	50, 200, 500	50,000 ohms	50-20,000 multiple alloy shield for extremely low hum pickup
A-12	Low impedance mike, pickup, or multiple line to push pull grids	50, 125/150, 200/250, 333, 500/600 ohms	80,000 ohms overall, in two sections	20-20,000
A-14	Dynamic microphone to one or two grids	30 ohms	50,000 ohms overall, in two sections	20-20,000
A-20	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125/150, 200/250, 333, 500/600 ohms	50, 125/150, 200/250, 333, 500/600 ohms	10-50,000
A-21	Mixing, low impedance mike, pickup, or line to line	50, 200/250, 500/600	50, 200/250, 500/600	30-30,000 multiple alloy shield for extremely low hum pickup

INTERSTAGE AUDIO TRANSFORMERS

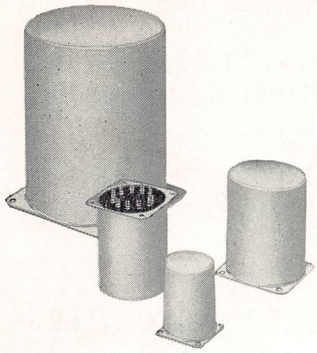
Type No.	Application	Primary Impedance	Secondary Impedance	± 2 db from
A-16	Single plate to single grid	15,000 ohms	60,000 ohms, 2:1 turn ratio	20-20,000
A-17	Single plate to single grid 8 MA unbalanced D.C.	As above	As above	40-20,000
A-18	Single plate to two grids. Split primary, can also be used for P.P. plates	15,000 ohms	80,000 ohms overall, 2.3:1 turn ratio overall	20-20,000
A-19	Single plate to two grids 8 MA unbalanced D.C.	15,000 ohms	80,000 ohms overall, 2.3:1 turn ratio overall	40-20,000

PLATE AND CRYSTAL TO LINE TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 2 db from
A-24	Single plate to multiple line	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	20-40,000
A-25	Single plate to multiple line 8 MA unbalanced D.C.	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	40-20,000
A-26	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200/250, 333, 500/600 ohms	20-40,000
A-27	Crystal microphone to multiple line	100, 000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	30-20,000 measured with non-inductive source
A-30	Audio choke, 250 henrys @ 5 MA 6000 ohms D.C., 65 henrys @ 10 MA 1500 ohms D.C. 450 henrys @ 0 MA			
A-32	Filter choke 60 henrys @ 15 MA 2000 ohms D.C., 15 henrys @ 30 MA 500 ohms D.C.			

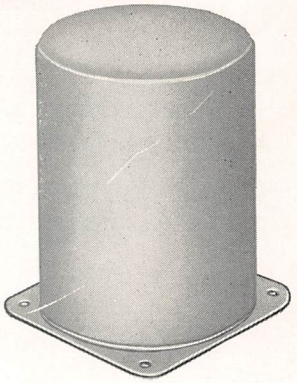


UTC COMMERCIAL GRADE COMPONENTS



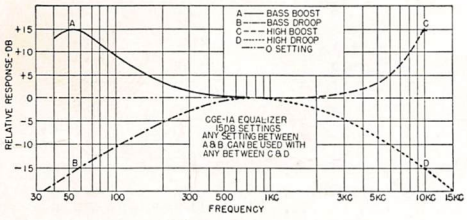
The commercial grade series of transformers incorporate conservative design and rugged construction to assure dependability under continuous service operation in industrial and commercial grade communication equipment. These units are mounted in uniform drawn cases finished in light grey enamel, and intended for chassis mounting. All items are poured with special sealing compound in addition to vacuum impregnation of coil structures.

CG-134, 135 and 136 are of the hum-bucking type to assure low hum pick-up. All audio components are linear. ±1½ DB from 40 to 10,000 cycles (no unbalanced D.C.), except CVL and CVM units . . . 40 to 6000 cycles. Parallel feed low level interstage units with 50,000 ohms and .25 mfd. 200 ohm windings on input transformers are balanced and may be used for 150 to 250 ohm circuits.



INPUT, INTERSTAGE, MIXING AND LOW LEVEL OUTPUT TRANSFORMERS

Type No.	Application	Primary Impedance Ohms	Max. Level dbm	Secondary Impedance Ohms	Case No.
CG-131	1 plate to 1 grid	15,000	+28	135,000 3:1 ratio	RC-50
CG-132	1 plate to 2 grids	15,000	+30	135,000 C.T. 3:1 ratio overall	RC-62
CG-133	2 plates to 2 grids	30,000 P to P	+32	80,000 overall 1.6:1 ratio ovarall	RC-75
CG-134	Line to 1 grid hum-bucking	50, 200, 500	+30	80,000	RC-50
CG-135	Line to 2 grids hum-bucking	50, 200, 500	+30	120,000 overall	RC-50
CG-235	Line to 1 or 2 grids, hum-bucking; multiple alloy shielded for low hum pickup	50, 200, 500 ohms	+28	80,000 overall	RC-75
CG-136	Single plate and low impedance mike or line to 1 or 2 grids hum-bucking	15,000, 50, 200	+30	80,000 overall	RC-62
CG-137	Mixing	50, 200, 500	+28	50, 200, 500	RC-50
CG-140	Triode plate to line	15,000	+30	50, 200, 500	RC-50
CG-141	PP triode plates to line	30,000 P to P	+32	50, 200, 500	RC-50
CG-233	PP 6C5, 12AU7, similar triodes to AB 45's, 2A3's, 6L6's, etc.	30,000 P to P	+35	25,000 overall .9:1 ratio overall	RC-87
CG-333	PP 6C5, 12AU7, similar triodes to fixed bias 6L6's	30,000 P to P	+35	5,000 overall .4:1 ratio overall	RC-87
CG-433	PP 45, 2A3, similar tubes to fixed bias 2 or 4 6L6's	5,000 P to P	10W.	1,250 overall .5:1 ratio overall	RC-100



UNIVERSAL INTERSTAGE EQUALIZER—CGE-1A

The UTC CGE-1A is the ideal device for any application where frequency response control is desired. Incorporating the latest developments in design and manufacture, this new unit provides the ultimate in control and flexibility. This equalizer is not a simple R-C tone control, but employs resonant circuits in a unique arrangement providing equalization characteristics unobtainable by conventional circuits. Designed to work from a low or medium impedance source (0 to 20,000 ohms) to a high impedance (500,000 ohms or open grid), the CGE-1A affords continuously variable equalization over a 30 DB range at either end of the spectrum, while introducing only 18 DB total insertion loss. (See curve above). Complete independence of high frequency and low frequency controls permits a wide variety of settings without affecting the over-all volume level. Because of its low insertion loss, this unit may be incorporated directly in many amplifiers. If existent gain is low, a single medium-mu triode stage will provide both proper gain and source impedance. The mechanical construction permits mounting with case on panel directly behind controls, or with case separated from controls and panel. An etched, calibrated panel is provided.

CGE-1A Panel Dim. 2⅜" x 3½" x 2½" deep. Wt. 2 lbs.

DYNAMIC NOISE SUPPRESSION INDUCTOR

Incorporates two accurate High Q coils [.8 hy. and 2.4 hy.] for use in dynamic noise suppression circuits. Excellent circuit accompanies unit.

Type CG-50 RC-62 Case

COMMERCIAL GRADE CASE

Case No.	Base Dim. (Sq.)	Mounting Dim. (Sq.)	Mounting Screw	Height +⅛, −1/16	Cutout Dia.	Unit Weight Lbs.
RC-37	1⅜	1⅛	4-40	1⅝	1¼	.35
RC-50	1⅝	1 5/16	6-32	2¼	1½	½
RC-62	1 3/16	1½	6-32	2½	1½	1
RC-75	2 3/16	1 3/16	8-32	2⅞	1⅞	1½
RC-87	2 3/16	2 3/32	8-32	3¼	2	2½
RC-100	3	2⅜	8-32	3¾	2⅝	3½
RC-112	3 7/16	2 11/16	10-32	4⅛	2⅞	5
RC-125	3¾	3	10-32	4½	3	6½
RC-150	4½	3 9/16	12-28	5½	3¾	11
RC-152	5⅛	4⅛	12-28	5½	4	15½
RC-175	5¾	4⅞	¼-20	7⅛	4	22

OUTPUT TRANSFORMERS

Secondary Impedances: 500, 200, 16, 8, 5, 3, 1.5 ohms

Type No.	Imped. P. P. Ohms, Overall	Typical Tubes	Max. Watts	Case No.
CG-15	8,000	6F6 triode, 6V6, 6AQ5	20	RC-100
CG-16	3,000/5,000	2A3, 6AS7G, 6L6, 6080	20	RC-100
CG-19	6,000/10,000	6V6, Triode: 6L6, 5881	20	RC-100
CG-710	14,000/20,000	7B5, 6AK6, 6K6GT	20	RC-100
CG-2L6	9,000	6L6's, AB1, 5881	30	RC-125

CG VARIMATCH OUTPUTS FOR P. A.

Universal units designed to match **any tubes** within the rated output power, to line or voice coil. Output impedance 500, 200, 50, 16, 8, 5, 3, 1.5 ohms. Primary impedance 3000, 5000, 6000, 7000, 8000, 10,000, 14,000 ohms.

Type No.	Audio Watts	Typical Tubes	Case No.
CVP-1	12	2A3, 25L6, 6V6, 6AQ5	RC-100
CVP-2	30	2A3, 6L6, 6V6, 807, 5881	RC-125
CVP-3	60	300B's, 6L6's, 807, 1614, 5881, 1625	RC-150
CVP-4	125	807's, 4-6L6's, 845's, 4-1614's, 6146, 6159	RC-152
CVP-5	300	242A's, 838's, 4-845's, ZB-120's	RC-175

CG VARIMATCH LINE TO VOICE COIL TRANSFORMERS

The UTC VARIMATCH line to voice coil transformers will match any voice coil or group of voice coils to a 500 ohm line. More than 50 voice coil combinations can be obtained, as follows:

.2, .4, .5, .62, 1, 1.25, 1.5, 2, 2.5, 3, 3.3, 3.8, 4, 4.5, 5, 5.5, 6, 6.25, 6.6, 7, 7.5, 8, 9, 10, 11, 12, 14, 15, 16, 18, 20, 25, 28, 30, 31, 40, 47, 50, 63, 69, 75.

Where speakers are to be connected in groups to one transformer, it is preferable that parallel connection be used to eliminate the possibility of multiple resonance. If two speakers of different impedances are connected in parallel, the lower impedance speaker will develop greater power. If connected in series, the higher impedance speaker will develop greater power.

Type No.	Audio Watts	Primary Impedance	Secondary Impedance	Case No.
CVL-1	15	500 ohms	.2 to 75 ohms	RC-87
CVL-2	40	500 ohms	.2 to 75 ohms	RC-125
CVL-3	75	500 ohms	.2 to 75 ohms	RC-150

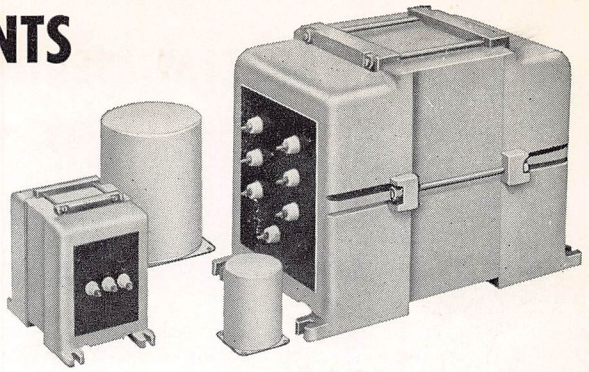
CG VARIMATCH LINE AUTOFORMERS

UTC Varimatch Line Autoformer will match one to ten 500 ohm lines or CVL windings to the 500 ohm output of an audio amplifier The CVL-10 autoformer has impedances of 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms

Type No.	Audio Watts	Case No.
CVL-10	15	RC-87

COMMERCIAL GRADE COMPONENTS

UTC CG power transformers, Varimatch units and chokes are designed to A.I.E.E. commercial standards. Ratings are conservative for continuous duty. Units are tested for breakdown at twice maximum working voltage plus 1000 volts and surge tested at 250% normal voltage. All items are vacuum impregnated and sealed with special insulating compound. The conservative design and manufacturing procedure of these units make them suitable for virtually all types of commercial equipment as well as ideally suited for quality amateur and public address service.



CG VARIMATCH MODULATION UNITS

Will match any modulator tubes to any RF load.
The ever increasing number of vacuum tubes available for audio and RF applications has increased the difficulty of obtaining transformers suitable for matching to the various correct tube loads. If a standard transformer having a limited impedance range is purchased and used for a specific purpose as the "nearest thing" available, comparatively high distortion is inevitable. While a 20% mismatch caused by such an occurrence does not represent a serious loss in power, it greatly reduces the undistorted power available from a class B modulator because optimum plate load is not reflected to the tubes. The UTC Varimatch transformer eliminates this difficulty through the use of a combination of tapped winding affording an extremely wide range in impedance matching. Designs provide that for any load impedance employed, full class C plate current can be carried by secondary winding.

Primary impedances from 500 to 20,000 ohms
Secondary impedances from 30,000 to 300 ohms

Type No.	Max. Audio Watts	Max. Class C Input	Typical Modulator Tubes	Case No.
CVM-0	12	25	2A3	RC-100
CVM-1	30	60	6V6, 2A3, 6L6, 807, 5881	RC-125
CVM-2	60	125	801A, 6L6, 809, T-20, 1608, 6159	RC-150
CVM-3	125	250	800, 807, 845, TZ-20, RK-30, 35-T	RC-152
CVM-4	300	600	50-T, 805, 838, T-55, ZB-120, 4-65A	RC-175
CVM-5	600	1200	805, HF-300, HK-354, 250TH, 810, 4-125A	7x12x9H 60 lbs.

CG VARIMATCH DRIVER TRANSFORMERS

Type No.	Primary	Typical Output Tubes	Max. Level Watts	Case No.
CG-51AX	All single tubes like: 6C5, 6C4, 12AU7, 2A3, 5814A	2A3, 6L6	1	RC-87
CG-53AX	P. P. tube like: 2A3, 6L6,	841, 801A, 800, 838, 805, 50T	20	RC-112
CG-59AX	50, 200, 500 ohm line	805, 838, ZB-120, 100TH 800, 55T	20	RC-112
CG-238AX	4-2A3, 2-211A, 2-845	4-805's, 4-838's, 2-HF300's, 2-HF-200's, 2-250TH's, 2-450TH's	40	RC-150

VARIPOWER AUTO-FORMERS

Type No.	Watts Output	Case No.
CVA-1	150	RC-112
CVA-2	250	RC-125
CVA-3	500	RC-150
CVA-4	1000	RC-152
CVA-5	2000	RC-175

Designed for line voltage control, filament control and reduced power operation. Output voltage from 0 to 130 volts, 50/60 cycles. Varipower units permit control of filament voltage at the tube socket to within 2½% of desired value simultaneously with line voltage control and plate voltage control. Can be used to reduce or increase voltages on filament transformers. Taps at 25, 55, 75, 95, 100, 105, 110, 115, 120, 125 and 130 volts permit output voltages from 0 to 130 volts in 5 volt steps.

POWER AND BIAS TRANSFORMERS

Primary 115 volts 50/60 cycles

(DC MA is for choke input. Reduce to 70% for condenser input.)

Type No.	High Voltage	DC MA.	Fil. 1	Fil. 2	Fil. 3	Fil. 4	Case No.
CG-422	435-365-0-365-435 125-0-125	125 25	5V-3A	5V-2A	6.3 VCT-3A	2.5 VCT-5A	RC-150
CG-428	500-0-500 80-0-80	250 100	5V-3A	5V-2A	6.3 VCT-4A	6.3 VCT-3A, tapped 2.5 VCT-3A	RC-152
CG-429	600-525-0-525-600	250	5V-3A	6.3 VCT-3-A	7.5 VCT-3A, tapped 6.3 VCT-4A		RC-152
CG-431	500-400-0-400-500 80-0-80	500 100	5V-6A	5V-2A	6.3 VCT-5A	6.3 VCT-3A	RC-175
CG-315	Tapped for any DC voltage from 15 to 100 volts within 6%—250 MA						RC-125
CG-316	Tapped for any DC voltage from 75 to 400 volts within 6%—250 MA						RC-152

CG PLATE TRANSFORMERS

Primaries for 105, 115, 220, 230 volts, 50/60 cycles. For reduced power, secondary voltages can be reduced to half by using 220V. Pri. on 110 volts. These transformers may be used on 25 to 43 cycles if 220V. Pri. is used on 110 volts. Secondary voltage is simultaneously halved.

Type No.	High Voltage	DC Voltage	DC MA	Case No.
CG-300	625-515-0-515-625	500/400	200	RC-150
CG-301	580-530-300-0-300-530-580	475/425/250	420	RC-152
CG-302	950-750-0-750-950	760/610	360	RC-175
CG-303	1500-1235-400-0-400-1235-1500	1250/1000 300	260* 175	RC-175

* 300MA, if used without load on low voltage winding.

TYPE EC CASE UNITS

Type No.	High Voltage	DC Voltage	DC MA	L	W	H	Mtg. Dim.	Wt. Lbs.
CG-304	1500-1235-0-1235-1500	1250/1000	800	15	8½	10⅜	7¼x13⅝	100
CG-305	2400-1750-0-1750-2400	2000/1500	300	10½	4¾	6⅞	3⅞x9 9/16	50
CG-306	2400-1750-0-1750-2400	2000/1500	500	15	8½	10⅜	7¼x13⅜	100
CG-307	3500-3000-2400-0-2400-3000-3500	3000/2500 2000	300	14½	8½	10⅜	7¼x12⅜	90
CG-308	3500-3000-2400-0-2400-3000-3500	3000/2500 2000	500	16½	8½	10⅜	7¼x14⅛	125
CG-309	3500-3000-2400-0-2400-3000-3500	3000/2500 2000	1000	21	10	13¼	8½x19	185
CG-310	4600-4050-3500-0-3500-4050-4600	4000/3500 3000	600	19	10	13¼	8½x16¼	150
CG-311	1500-1235-0-1235-1500	1250/1000	500	10½	4¾	6⅞	3⅞x9 9/16	50
CG-312	1800-1500-0-1500-1800	1500/1250	400	10½	4¾	6⅞	3⅞x9 9/16	50

FILTER CHOKES

INDUCTANCE SHOWN IS AT RATED DC MA

Type No.	Inductance Henrys	DC MA	DC Res. Ohms	Test Volts RMS	Case No.
CG-40	10	200	110	1750	RC-112
CG-41	4-20	200	110	1750	RC-112
CG-44	30	100	400	1750	RC-100
CG-45	250	15	5000	1750	RC-87
CG-48C	75	50	2200	1750	RC-87
CG-100	12	150	110	2500	RC-125
CG-102	12	250	100	3000	RC-150
CG-104	10	350	90	5000	RC-152
CG-108	10	500	52	7000	RC-175
CG-1S	10	1000	40	9000	11½x4¾x 6⅞ H, 40 lb.

SWINGING INPUT CHOKES

INDUCTANCE SHOWN IS FROM 100% TO 10% OF RATED DC MA

Type No.	Inductance Henrys	DC MA	DC Res. Ohms	Test Volts RMS	Case No.
CG-101	5-25	150	110	2500	RC-125
CG-103	5-25	250	100	3000	RC-150
CG-105	5-25	350	90	5000	RC-152
CG-109	5-25	500	52	7000	RC-175
CG-1C	5-25	1000	40	9000	11½x4¾x 6⅞ H, 40 lb.

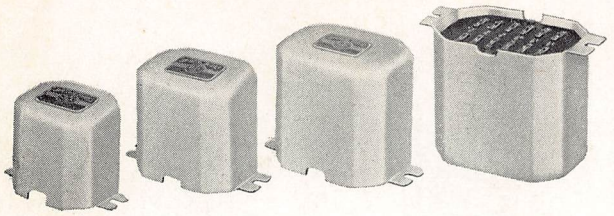
FILAMENT TRANSFORMERS

Primary 105, 115, 210, 220, 230 volts, 50/60 cycles, except CG-34 . . . 105, 115, 220, 230. These transformers may be used on 25 to 43 cycles if 220 volt primary is used on 110 volts. Secondary voltage is simultaneously reduced to half.

* Two Windings.

Type No.	Sec. Volts C. T.	Sec Amps.	Working Voltage	Test Volts RMS	Case No.
CG-33	6.3	4	500	2000	RC-75
CG-34	2½	10	2500	6000	RC-112
CG-120	2½	10	5000	11000	RC-125
CG-121	5	25	5000	11000	RC-150
CG-122	7.5/6.3	10	1500	4000	RC-125
CG-124	10	10	1500	4000	RC-150
CG-125	14/12/11	10	1500	4000	RC-150
CG-126	14/11/10 14/11/10	10 10	1500	4000	RC-152

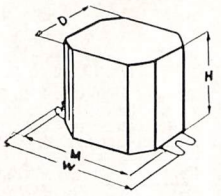
SPECIAL SERIES AUDIO TRANSFORMERS



UTC Special Series transformers are specifically designed for amateur and popular-priced PA service. The Special units are finished in a rich, commercial type medium gray enamel. A recessed terminal strip is provided permitting above chassis or breadboard wiring in addition to standard chassis type wiring. The universal windings provided on driver, matching and output transformers assure a maximum of flexibility. Modulator output units will carry the DC current of the class C stage for any of the impedances available and will match practically any audio tubes to any RF load within the power rating of the transformer. Large components are housed in formed cases with top or bottom mounting. All units are vacuum impregnated—compound filled.

CASE SIZES

Type No.	H	W	D	M	Wt. Lbs.
G-1	1⅞	2 13/16	1¾	2⅜	1
G-2	2 5/16	3⅜	1 15/16	2⅞	1½
G-3	2½	3¾	2 5/32	3¼	2
G-4	2 15/16	4⅛	2 5/16	3⅝	3



CLASS A INPUT TRANSFORMERS

Type No.	Application	Ratio	Case
S-1	1 plate* to 1 grid	3½:1	G-2
S-2	1 plate* to 2 grids	2:1 4:1	G-2
S-3	1 plate* to 1 or 2 grids compact type	2:1	G-1
S-4	1 plate* to 2 grids wide range response	1:1	G-3
S-5	Single or double button mike or line to 1 grid hum-bucking type	16:1	G-2
S-6	Single or double button mike or line to 1 grid, compact type	16:1	G-1
S-7	Single plate* and carbon mike to one or two grids	3:1 16:1	G-2

* Will match tubes like 6J5, 6C4, 12AU7, etc. Can be used with high mu triodes with loss in low frequencies.

UNIVERSAL DRIVER TRANSFORMERS

(See Modulator chart for tube types)

Type No.	Application	Max. Watts	Case
S-8	Single driver plate to pushpull grids	1	G-3
S-9	Pushpull driver plates to grids of class B tubes up to 400 watts output	20	G-4
S-10	12AU7 or similar plates to 5881 or 6L6's, self or fixed bias	2	G-3

MATCHING TRANSFORMERS

Type No.	Application	Pri. Ohms	Sec. Ohms	Case
S-11	Single 6J5, 6C4, 12AU7 or similar tube to line	15,000	200/500	G-2
S-12	Line to speaker 15 watts	500, 2000, 4000	2, 4, 8, 15	G-2
S-13	Line to speaker 30 watts	500, 2000, 4000	2, 4, 8, 15	G-4

UNIVERSAL OUTPUT TRANSFORMERS TO LINE AND VOICE COIL

(Secondary Impedances: 500, 15, 8, 2 ohms)

Type No. Max. Watts	Primary Impedance	Typical Tubes	Class	Case
	Single Tubes:			
S-14 10 W.	2500 ohms 4000 ohms 7000 ohms 10,000 ohms	2A3, 6B4, 6L6, 6Y6, 25L6GT, 35L6GT 6V6, 12A6 6AC5, 6F6, 7B5, 6K6GT 1G5, 3C5, 6A4, 6N7	A A A A	G-2
	P. P. Tubes:			
S-15 12 W.	4000 ohms 5000 ohms 10,000 ohms	6Y6, 25L6GT 2A3, 6AS7G 6080	AB AB B	G-2
S-16 30-W.	3000 ohms 6000 ohms 9000/10000 ohms	2A3, 25L6GT 6F6 triodes, 6AS7G 2A5, 6F6, 6L6, 6V6, 807-triode	AB AB AB	G-4
S-17 55 W.	3800 ohms 4500/5000 ohms	6L6's 4—6L6's 809, 6146	AB2 AB1 B	G-5

UNIVERSAL MODULATION TRANSFORMERS

Secondary carries class C current
Any modulator tubes to any RF load. (See chart)

Type No.	Audio Power	Case
S-18	12 watts	G-3
S-19	30 watts	G-4
S-20	55 watts	G-5
S-21	110 watts	G-7
S-22	250 watts	G-9

TYPICAL MODULATOR COMBINATIONS

S-18—12 WATTS MAX.

Typical driver tubes: 6C4, 12AU7, 6J5, 6J7-TR, 6CG7, 6SN7GT.

DRIVER Transf.	Sec. Term.	P. P. Tubes	MODULATOR STAGE Watts Output	P. P. Load	Plate Volts	Bias Volts
S-2	G-G	6E6	1.6	14,000	250	27
S-2	G-G	25L6GT	4	4,000	110	7.5
S-2	G-G	6Y6G	7	4,000	135	13.5
S-8	G'-G'	6AC5G	8	10,000	250	0
S-2	G-G	2A3	10	5,000	325	750 ohms
S-2	G-G	6AS7G	10	5,000	250	1,250 ohms
S-1	F-G	6V6, 6AQ5		6,000		
S-1	F-G	6K6		10,000		

S-19—30 WATTS MAX.

Tube or Tubes	DRIVER Transf.	Sec. Terms	MODULATOR STAGE P. P. Tubes	Watts Output	P. P. Load	Plate Volts	Bias Volts
6C4	S-10	G-G	6V6	13	8,000	300	20
6C4	S-10	G-G	2A3, 6A3,	15	3,000	325	68
6C4	S-10	G-G	6F6, 6AQ5 Pentode AB	10	10,000	375	340 ohms
6AQ5	S-8	G-G	6F6 triode AB	18	6,000	350	38
45	S-8	G-G	10, 1602	25	8,000	425	50
45	S-8	G'-G'	46	25	6,000	425	0
45	S-8	G'-G'	841	28	7,000	425	5
6C4	S-10	G-G	6L6 self bias	30	9,000	400	23

S-20—55 WATTS MAX.

P. P. Tubes	DRIVER Transf.	Sec. Terms.	MODULATOR STAGE P. P. Tubes	Watts O'tp't	P. P. Load	Plate Volts	Plate Tr'sf.	Bias Volts	Bias Tr'sf.
2A3	S-9	1-1	801A	45	10000	600	S-45	75	S-51
2A3	S-9	1-1	T-20	50	8000	600	S-45	30	S-51
12AU7	S-9	2-2	2E26	54	8000	500	S-41	15	S-51
12AU7	S-10	G-G	6L6, AB2	60	3800	400	S-39	25	S-51
12AU7	S-10	G-G	4-6L6	60	4500	400	S-40	23	S-51
2A3	S-9	3-3	809	60	5000	500	S-41	0	

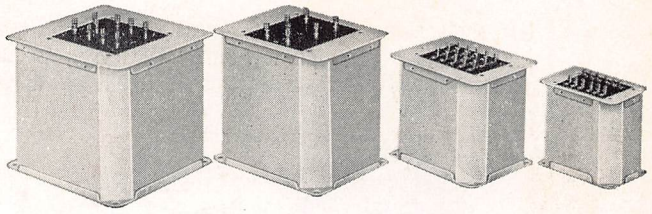
S-21—115 WATTS MAX.

P. P.-2A3 Driver S-9 Transf. Sec. Term.	P. P. Tubes	MODULATOR STAGE Watts Output	P. P. Load	Plate Volts	Plate Transf.	Bias Volts	Bias Trsf.
2-2	TZ-20	70	12000	800	S-46	0	
1-1	T-20	70	12000	800	S-46	40	S-51
*	845	75	4600	1000	S-47	175	S-52
1-1	807	80	6600	600	S-45	30	S-51
2-2	6146	95	6000	600	S-46	50	S-51
1-1	800, RK-30	100	12000	1000	S-47	55	S-51
3-3	809	100	8400	750	S-45	5	S-51
2-2	825	100	6600	850	S-46	30	S-51
2-2	TZ-40	100	6000	750	S-45	0	
2-2	T-756	100	7000	850	S-46	30	S-51
1-1	50-T	100	8000	1000	S-47	90	S-51
2-2	RK-18	100	12000	1000	S-47	50	S-51
1-1	HK-354	100	15000	1000	S-47	60	S-51
*	845	105	8800	1250	S-47	225	S-52
3-3	RK-31	110	14000	1000	S-47	0	
1-1	4-6L6	110	2000	400	S-44	25	S-51
2-2	35-T	115	11000	1000	S-47	30	S-51

* Reverse S-9 transformer using terminals 1-1 for plates and P. P. for grids.

UTC SPECIAL SERIES POWER EQUIPMENT

UTC Special Series power supply components are designed specifically for amateur and popular-priced PA service. The ratings are based on such applications and recommended for ICAS intermittent use. For commercial application, CG or H grade components should be employed. Tapped coil structures on power and bias supply transformers afford maximum flexibility, permitting a given transformer to be used with many circuits and types of tubes. Stand by service should not be obtained by interrupting high voltage center tap.



S-22—250 WATTS MAX.

P. P.-2A3 Driver S-9 Transf. Sec. Term.	P. P. Tubes	Watts Output	MODULATOR STAGE P. P. Load	Plate Volts	Plate Transf.	Bias Volts	Bias Trsf.
3-3	RK-31	140	17000	1250	S-47	0	
*	50 T	250	20000	2000	S-50	180	S-52
*	50 T	160	17000	1500	S-49	140	S-52
2-2	TZ-40	175	6800	1000	S-47	0	
1-1	T-55	175	6900	1000	S-47	40	S-51
1-1	T-55	225	9400	1250	S-47	50	S-51
2-2	HF-100	250	12000	1500	S-49	52	S-51
2-2	100 TH	250	7200	1250	S-47	0	
¶	100 TL	230	7200	1250	S-47	112	S-52
2-2	ZB-120	150	4800	750	S-45	0	
2-2	ZB-120	245	9000	1250	S-47	0	
*	HK-154	225	11400	1250	S-47	210	S-52
1-1	203 A	250	9000	1250	S-47	45	S-51
3-3	203 Z	200	6900	1000	S-47	0	
1-1	211	200	6900	1000	S-47	77	S-51
1-1	211	250	9000	1250	S-47	100	S-51
1-1	HK-354	220	15000	1500	S-49	100	S-51
2-2	808	190	12700	1250	S-47	15	S-51
2-2	830 B	175	7600	1000	S-47	35	S-51
2-2	838	250	9000	1250	S-47	0	

* Reverse S-9, using 2-2 for plates and P-P for grids.
¶ Reverse S-9, using 1-1 for plates and P-P for grids.

CASE SIZES

(Will take 12-28 Mtg. Screw)

Type No.	H	W	D	M	N	Wt. Lbs.
G-5	3¾	3⅛	4½	3⅞	2 7/16	4½
G-7	4⅝	4⅝	5½	4 27/32	3 25/32	8
G-8	4⅝	5⅜	5⅜	4 25/32	4¾	12
G-9	5⅞	5⅜	6¾	6 3/32	4 19/32	21
G-10	5⅞	6⅛	6⅝	5 15/16	5 13/32	24
G-11	5⅞	6½	7⅜	6 21/32	5 29/32	31
G-12	10¼	7⅜	9¼	8½	6⅝	52

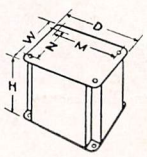


PLATE TRANSFORMERS — BIAS TRANSFORMERS

Primary 115 V.—50/60 Cycles

Type No.	High Voltage	DC Voltages*	DC Current	Case No.
S-44	575-525-0-525-575	470/430	500 Ma.	G-9
S-45	900-750-0-750-900	750/620	200 Ma.	G-8
S-46	1000-750-0-750-1000	825/600	300 Ma.	G-9
S-47	1500-1250-1000-0-1000-1250-1500	1275/1050/825	300 Ma.	G-10
S-48	1500-1250-1000-0-1000-1250-1500	1300/1075/850	500 Ma.	G-11
S-49	2100-1800-1500-0-1500-1800-2100	1815/1540/1275	300 Ma.	G-11
S-50	3000-2500-0-2500-3000	2625/2175	300 Ma.	G-12
S-51	Will supply any bias voltage from 15 to 100 volts DC within approximately 6% of desired value.		200 Ma.	G-5
S-52	will supply any bias voltage from 75 to 400 volts DC within approximately 6% of desired value.		200 Ma.	G-7

* Based on two section filter for 200 Ma. and 300 Ma. units, single section filter for 500 Ma. units, both choke input.
† 200 Ma. if used alone. ‡ 300 Ma. if used alone.

FILTER, SWINGING, AND AUDIO CHOKES

Type No.	Service	Inductance	Current	Resistance	Test Volts Rms	Case No.
S-23	Audio	300 Hy.	5 Ma.	5000 ohms	1500 V.	G-2
S-24	P. P. Choke	500 Hy. C. T.	3 Ma.	6000 ohms	1500 V.	G-2
S-25	Filter	30 Hy.	30 Ma.	800 ohms	1500 V.	G-2
S-26	Filter	12 Hy.	60 Ma.	250 ohms	1500 V.	G-2
S-27	Filter	25 Hy.	75 Ma.	350 ohms	1500 V.	G-4
S-28	Filter	20 Hy.	100 Ma.	350 ohms	1500 V.	G-4
S-29	Filter	6 Hy.	175 Ma.	90 ohms	1500 V.	G-4
S-30	Swinging	4/20 Hy.	175 Ma.	90 ohms	1500 V.	G-4
S-31	Filter	6 Hy.	225 Ma.	100 ohms	2700 V.	G-5
S-32	Swinging	4/20 Hy.	225 Ma.	100 ohms	2700 V.	G-5
S-33	Filter	8 Hy.	300 Ma.	100 ohms	4000 V.	G-7
S-34	Swinging	4/20 Hy.	300 Ma.	100 ohms	4000 V.	G-7
S-35	Filter	8 Hy.	400 Ma.	60 ohms	5000 V.	G-8
S-36	Swinging	4/20 Hy.	400 Ma.	60 ohms	5000 V.	G-8
S-37	Filter	8 hy.	550 Ma	60 ohms	6000 V.	G-8
S-38	Swinging	4/20 Hy.	550 Ma.	60 ohms	6000 V	G-8

COMBINED PLATE AND FILAMENT UNITS

Primary 115 V.—50/60 Cycles

Type No.	Voltage	D. C. Voltages*	Rectifier Fil.	Fil. No. 1	Fil. No. 2	Case No.
S-39	490-400-0-400-490 175 Ma.	400/310	5 V.-3A	2.5 V.C.T. -6A	6.3 V.C.T. 4A	G-7
S-40	525-425-0-425-525 250 Ma.	400/310	5 V.-3A	6.3 V.C.T. -3A	6.3 V.C.T. 3A	G-7
S-41	600-0-600 200 Ma.	475	5 V.-3A	7.5 V. tapped 6.3 V.-3A	6.3 V.C.T. 2A	G-7
S-42	600-525-0-525-600 300 Ma.	480/400	5 V.-6A	7.5 V. tapped 6.3 V.-3A	6.3 V.C.T. 3A	G-8
S-43	525-0-525 450 Ma. 40-0-40 200 Ma.	400	5 V.-3A 5 V.-6A	6.3 V.-2A	6.3 V.C.T. 5A	G-9

* Based on two section filter, choke input.

FILAMENT TRANSFORMERS

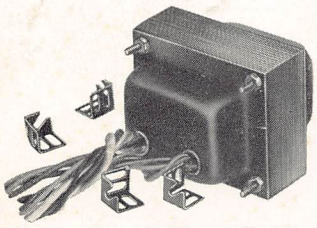
Primary Tapped 105, 115 Volts—50/60 Cycles

Type No.	Secondary Volts	Secondary Current	Test Volts Rms	Case No.
S-53	2.5 VCT	10 A.	1500 V.	G-3
S-54	5 VCT	4 A.	2500 V.	G-3
S-55	6.3 VCT	3 A.	1500 V.	G-3
S-57	2.5 VCT	10 A.	10,000 V.	G-5
S-58	2.5 VCT	20 A.	10,000 V.	G-5
S-59	5 to 5.25 VCT	13 A.	5000 V.	G-5
S-60	5 to 5.25 VCT	22 A.	10,000 V.	G-7
S-61	7.5 VCT tapped 6.3 VCT	10 A.	3000 V.	G-5
S-62	10 VCT	10 A.	3000 V.	G-5
S-63	14 VCT tapped 12 VCT and 11 VCT	10 A.	5000 V.	G-7

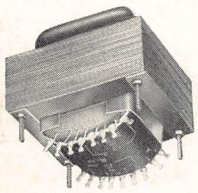
Type No.	Fil. 1	Fil. 2	Fil. 3	Test Volts	Case No.
S-64	2.5 VCT-5A	2.5 VCT-5A	5 VCT-6A	3000 V.	G-5
S-65	2.5 VCT-5A	5 VCT-4A	6.3 VCT-3A	3000 V.	G-5
S-67	5 VCT-6A	6.3 VCT-5A		3000 V.	G-5
S-68	5 VCT-3A	6.3 VCT-4A	7.5 VCT-5A	3000 V.	G-5
S-70	6.3 VCT-5A	6.3 VCT-5A		3000 V.	G-5
S-71	2.5 VCT-6A	2.5 VCT-6A	2.5 VCT-12A	10000 V.	G-7
S-72	5 VCT-3A	5 VCT-3A	5 VCT-6A	5000 V.	G-5

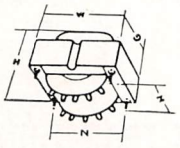
UTC REPLACEMENT TYPE COMPONENTS

UTC replacement type transformers (Pri. 117 V. 50/60 cycles) represent the culmination of years of development in this field. All units are low temperature rise, vacuum sealed against humidity with special impregnating materials to prevent corrosion and electrolysis. **Shells are finished in attractive high lustre black enamel.**

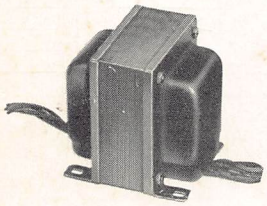


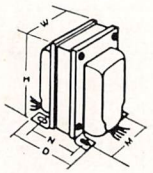
DOUBLE SHELL TYPE



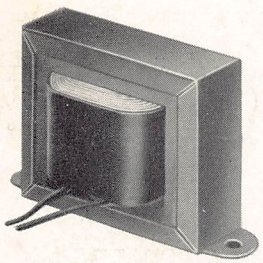


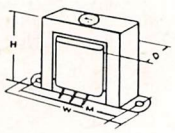
SINGLE SHELL TYPE





VERTICAL SHELL TYPE





CHANNEL FRAME TYPE

DOUBLE SHELL POWER TRANSFORMERS

Type No.	High V.	DC MA.	Rec. Fil.	Amp. Fil.	W	D	H	M	N	Wt. Lb.
R-101	275-0-275	50	5V-2A.	6.3V CT-2.7A	3	2½	2¾	2½	2 1/16	2½
R-102	350-0-350	70	5V-3A.	6.3V CT-3A	3	2½	3⅜	2½	2 1/16	3½
R-103	350-0-350	90	5V-3A.	6.3V CT-3.5A	3⅜	2⅞	3⅜	2 13/16	2¼	4½
R-104	350-0-350	120	5V-3A.	6.3V CT-5A	3¾	3⅛	3⅜	3⅛	2½	5½
R-105	385-0-385	160	5V-3A.	6.3V CT-5A	3¾	3⅛	3⅞	3⅛	2½	7

SINGLE SHELL POWER TRANSFORMERS

Type No.	High V.	DC MA.	Rec. Fil.	Amp. Fil.	W	D	H	M	N	Wt. Lb.
R-106	300-0-300	50	5V-2A.	6.3V CT-2.7A	3	2½	3	2½	2 1/16	2½
R-107	350-0-350	70	5V-3A.	6.3V CT-3A	3	2½	3⅝	2½	2 1/16	3½
R-108	350-0-350	120	5V-3A.	6.3V CT-5A	3¾	3⅛	3⅝	3⅛	2½	5½
R-109	400-0-400	200	5V-3A.	6.3V CT-6A	4½	3¾	4	3¾	3	8

VERTICAL SHELL POWER TRANSFORMERS

Type No.	High V.	DC MA.	Rec. Fil.	Amp. Fil.	W	D	H	M	N	Wt. Lb.
R-110	300-0-300	50	5V-2A.	6.3V CT-2.7A	2½	2½	3¼	2	1¾	2½
R-111	350-0-350	70	5V-3A.	6.3V CT-3A	2½	3⅛	3¼	2	2⅜	3½
R-112	350-0-350	120	5V-3A.	6.3V CT-5A	3¼	3⅝	4	2½	2½	5½
R-113	400-0-400	200	5V-3A.	6.3V CT-6A	3⅞	4¼	4⅝	3	3⅛	8

CHANNEL FRAME FILTER CHOKES

Inductance Shown Is at Rated D.C.M.A.—Test Volts RMS: 1500

Type No.	Induct. Hys.	Current	Resistance Ohms	W	D	H	M	Lbs.
R-55	6	40MA	300	2½	1⅜	1⅜	2	½
R-14	8	40MA	250	2⅞	1⅜	1 11/16	2⅜	¾
R-15	12	30MA	450	2⅞	1⅜	1 11/16	2⅜	¾
R-16	15	30MA	630	2⅞	1⅜	1 11/16	2⅜	¾
R-17	20	40MA	850	3 5/16	1⅝	2	2 13/16	1
R-18	8	80MA	250	3 5/16	1⅝	2	2 13/16	1
R-19	14	100MA	450	3¾	1¾	2 5/16	3⅛	1½
R-20	5	200MA	90	4⅛	2	2⅝	3 9/16	2½
R-21	3/15	200MA	90	4⅛	2	2⅝	3 9/16	2½

CHANNEL FRAME AUDIO TRANSFORMERS

Type No.	Application	Description	Dimen., Ins. W	D	H	M	Lbs.
R-33	1 plate to 1 grid	4:1 ratio	2⅞	1⅜	1 11/16	2⅜	¾
R-34	1 plate to 2 grids	2:1 ratio	2⅞	1⅜	1 11/16	2⅜	¾
R-35	Mike to 1 grid	17:1 ratio to Pri. C.T.	2⅞	1⅜	1 11/16	2⅜	¾
R-58	5 watt Universal output	Any single tube to any voice coil, .1 to 30 ohms	2½	1⅜	1⅜	2⅛	½
R-38A	6 watt Universal	Any tubes up to 6 watts to any voice coil, .1 to 30 ohms	2½	1⅜	1⅜	2⅛	½
R-59	10 watt Universal	Any tubes up to 10 watts to any voice coil, .1 to 30 ohms	2⅞	1⅜	1 11/16	2⅜	½
R-60	15 watt Universal	Any tubes up to 15 watts to any voice coil, .1 to 30 ohms	3 5/16	1⅝	2	2 13/16	1
R-39	10 watt line Matching Transformer	250, 500, 1,500 ohms to 2, 8, 15 ohms	2⅞	1⅜	1 11/16	2⅜	¾
R-40	25 watt line Matching Transformer	250, 500, 1,500 ohms to 2, 8, 15 ohms	4⅛	2¼	2⅝	3 9/16	2½

FILAMENT TRANSFORMERS

CHANNEL FRAME TYPE

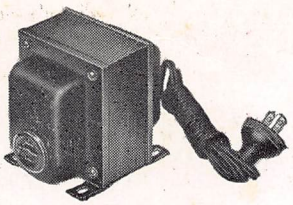
Pri. 115 V. 50/60 Cycles—Test Volts RMS: 1500

Type No.	Secondary	Dimensions, Inches W	D	H	M	Wt. Lbs.
FT-1	2.5 V.C.T.-3A	2⅞	1⅜	1 11/16	2⅜	¾
FT-2	6.3 V.C.T.-1.2A	2⅞	1⅜	1 11/16	2⅜	¾
FT-3	2.5 V.C.T.-6A	3 5/16	1⅝	2	2 13/16	1
FT-4	6.3 V.C.T.-2.5A	3 5/16	1⅝	2	2 13/16	1
FT-5	2.5 V.C.T.-10A	3¾	1¾	2 5/16	3⅛	1½
FT-6	5 V.C.T.-3A	3¾	1¾	2 5/16	3⅛	1½
FT-7	7.5 V.C.T.-3A	3¾	1¾	2 5/16	3⅛	1½
FT-8	6.3 V.C.T.-6A	4⅛	2¼	2⅝	3 9/16	2½
FT-9	2.5 V.C.T.-10A 10000V. Test	4⅛	2¼	2⅝	3 9/16	2½
FT-10	24V CT-2A or 12V-4A	4⅛	2¼	2⅝	3 9/16	2½

STEP DOWN AUTO-TRANSFORMERS

220/240 Volt to 110/120 Volts, 50/60 Cycles.
All units have 6 foot cord and female receptacle, except R-64.

Type No.	Rating Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
R-41	85	2⅝	2⅝	3⅛	2 x1⅞	4
R-42	125	3	3	3½	2¼x2 1/16	5
R-43	175	3¼	3¼	3⅞	2½x2¼	5½
R-44	250	3⅞	3¼	3⅞	2½x2⅞	6½
R-45	500	4⅛	3⅞	4⅝	3 x3¼	12
R-46	1200	6⅜	3⅞	4⅝	3 x5½	18
R-64	2500	10½	4¾	6¾	3⅞x9⅞	30



EXPORT VOLTAGE ADAPTER

Complete with cord and plug and special locking switch providing for line voltages of 105, 115, 125, 135, 150, 210, 230, 250 volts; 42 to 60 cycles. Output voltage 115.

Type No.	Rating Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
R-47	85	4⅜	3	3½	2¼x2¼	4½
R-48	150	4⅜	3¼	4	2½x2¼	5½

TV VOLTAGE REGULATOR

Complete with cord, plug, and special locking switch. Permits operation of 115 volt 50/60 cycle TV sets on line voltages of 85, 90, 95, 100, 105, 110, 120, 125 V.

Type No.	Rating Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
R-49	350	5	3¼	4	2½x2¾	5

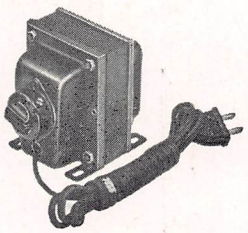


PHOTO FLASH TRANSFORMERS

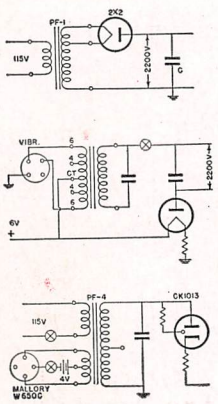
Can be used for either standard (Amglo type) or trigger (Sylvania type) multiple flash bulbs. Circuit details included with transformer.

PF-1 Primary for 115 volts, 50/60 cycles. Secondaries for power supply delivering 2200 volts DC to condenser up to 100 Mfd. Compound sealed in G-3* case 2⅛ x 2¾ (5¾ including flanges) x 2½ inches high. Weight 2 lbs.

PF-2 For portable service. Primary tapped for 4 volt or 6 volt battery (full valve vibrator). Secondary for power supply delivering 2200 volts DC to condenser up to 60 Mfd. Compound sealed in G-3* case. Weight 2 lbs.

PF-3 Trigger Transformer 15 KV peak. ⅞ O.D. x 3" long. Weight 2 Oz.

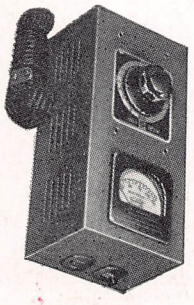
* See page 31.



VARITRAN VOLTAGE ADJUSTERS

Input 115 volts 50/60 cycles. Output continually adjustable from 0-130 Volts through roller contact on exposed autotransformer winding. Regulation and efficiency are excellent, no wave form distortion. Output voltage is independent of load. Complete with line cord, switch, and receptacle . . . for loads up to 570 Watts . . . 5 A.

Type		L	W	H	Wt. Lbs.
V-1-M	with meter	4⅞ x	9⅞ x	3⅝	14
V-1	without meter	4⅞ x	8 x	3⅝	12

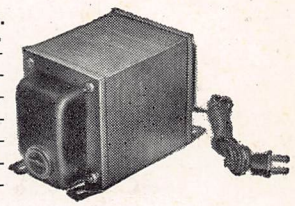


ISOLATION TRANSFORMERS

Ideal for isolating line noise, AC-DC sets, etc. Excellent electrostatic shielding. 1500 volt breakdown test. Six foot cord and female receptacle, except R-77.

Primary 110-120 volts, 50/60 cycles—Secondary 110-120 volts

Type No.	Rating Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
R-72	40	2¾	2⅝	3⅛	2 x1⅞	4
R-73	100	3⅜	3¼	3⅞	2½x2⅜	6
R-74	250	4⅜	3⅞	4⅝	3 x3½	12
R-75	600	6⅞	3⅞	4⅝	3 x6	20
R-76	1200	8⅜	4½	5⅞	3⅝x6⅝	30
R-77	2500	12	7	9	6 x12	70



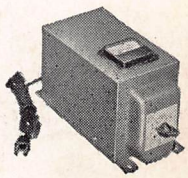
LINE VOLTAGE ADJUSTERS WITH METER

The perfect answer to abnormal or fluctuating line voltage. Adjust switch so that meter reads at red line and you know that your equipment is working at correct voltage.

These units combine a tapped auto-transformer with a switch and meter in a compact, rugged assembly.

The nine tap switch provides for line voltage of 60 to 140 volts on 115 volt output models and 160 to 240 volts on 230 volt output models.

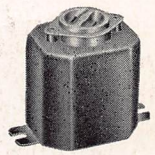
All units are designed for 50/60 cycle service and come complete with 6 foot input cord and plug and outlet receptacle.



Type No.	Primary Voltages	Sec. Volts	Rating Watts	L	W	H	Wgt. Lbs.
R-78	60, 70, 80, 90, 100, 110, 120, 130, 140	115	150	7	4	4¾	6
R-79	60 70, 80, 90, 100, 110, 120, 130, 140	115	300	7	4	4¾	9
R-80	60, 70, 80, 90, 100, 110, 120, 130, 140	115	600	10¼	4	4¾	13
R-81	60, 70, 80, 90, 100, 110, 120, 130, 140	115	1200	10¼	4	4¾	21
R-83	160, 170, 180, 190, 200, 210, 220, 230, 240	230	150	7	4	4¾	6
R-84	160, 170, 180, 190, 200, 210, 220, 230, 240	230	300	7	4	4¾	9
R-85	160, 170, 180, 190, 200, 210, 220, 230, 240	230	600	10¼	4	4¾	13
R-86	160, 170, 180, 190, 200, 210, 220, 230, 240	230	1200	10¼	4	4¾	21

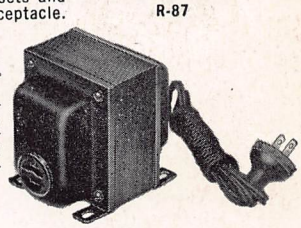
VOLTAGE BOOSTERS

The constantly increasing appliance load in home and office presents a serious low line voltage problem to which the UTC voltage booster is a perfect answer. These autotransformers are designed to operate from a 95 to 110 V. 50/60 cycle line. They boost the voltage 10%. The two ratings shown are ideal for TV sets and air conditioners. Complete with line cord and receptacle.



R-87

Type No.	Rating Amp.	Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
R-87	3	350	3⅜	2	2¾	2⅞	2
R-88	18	2000	3⅞	4⅛	4⅝	3x3	12



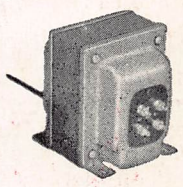
R-88

SIGNALLING AND CONTROL TRANSFORMERS

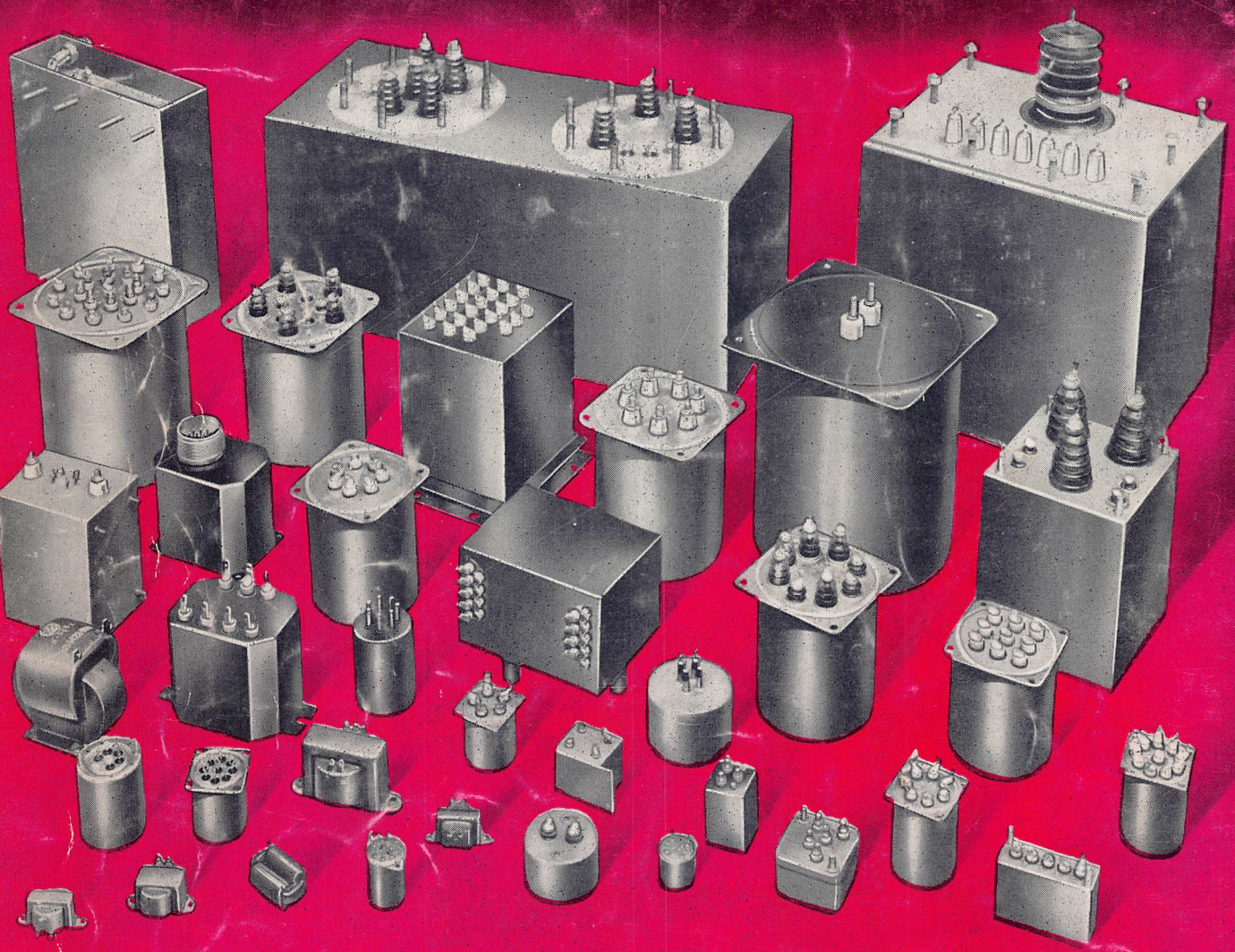
Primary 110-120 volts, 50/60 cycles—Secondary 4/8/12/16/20/24 volts

High power transformers suitable for operating relays, sirens, horns, gongs, etc. from 115 V. 50/60 cycle line. These units have four secondary terminals providing 4, 8, 12, 16, 20 and 24 volt output. The volt ampere rating is based on the 24 volt secondary tap with corresponding reduction at the lower voltages. Underwriters' approved primary leads are employed, and screw-type binding posts.

Type No.	Rating Watts	L	W	H	Mtg. Dim.	Wgt. Lbs.
SC-3	50	3	x 3½ x	3 9/16	1⅞ x 2¼	3
SC-4	100	3¼ x	4 x	4	2⅛ x 2½	5
SC-5	250	4	x 5 x	4¾	3¼ x 3	10



UTC for MILITARY COMPONENTS



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